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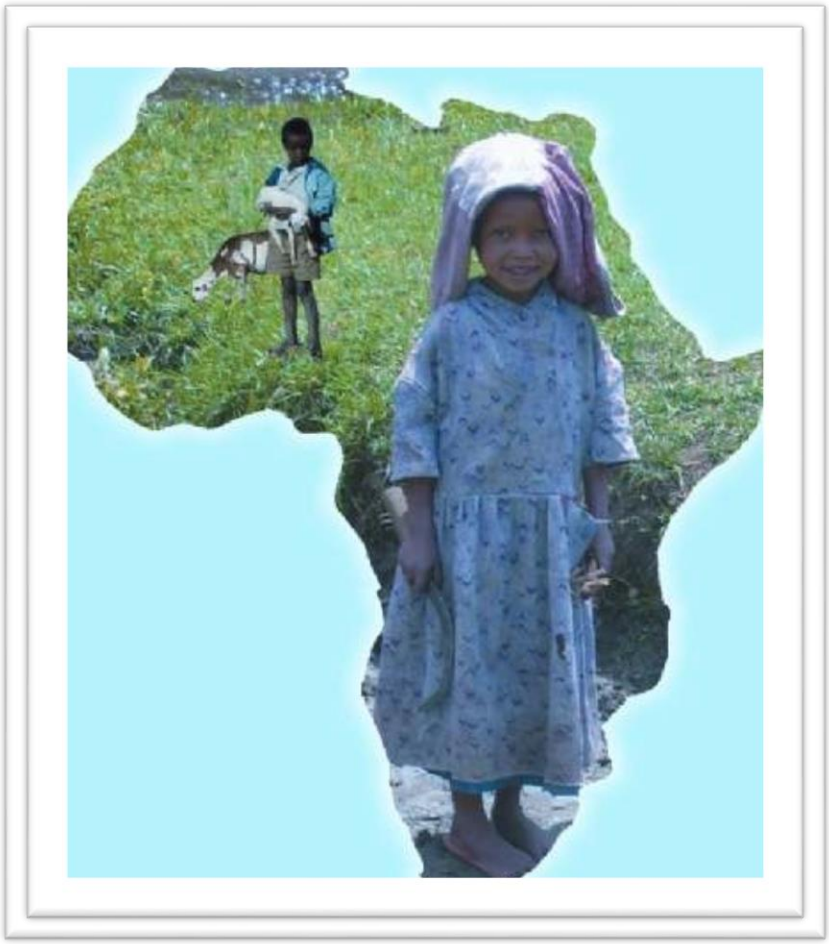

FACTORS AFFECTING CHILD POVERTY IN SUB SAHARAN AFRICA REVISTED WITH SPECIAL REFERENCE TO EDUCATION AND RURAL WOMEN 1990-2010

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"They that be slain with the sword are better than they that be slain with hunger; for these pine away, stricken through for want of the fruits of the field". (Bible- Lamentations 4:9).

Rose Ingutia

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ACRONYMS

ACPF	African Child Policy Forum
AGV	Agricultural Value Added
BMI	Body Mass Index
CAR	Central African Republic
CHIP	The Childhood Poverty Research and Policy Centre
CU	Child Underweight
CPI	Crop Production Index
CL	Child Labour
CM	Child Marriage
CRC	Convention on the Rights of the Child
CWCCL	Children's World Congress on Child Labour
DFID	Department of International Development
DPT_3	Diphtheria, Pertussis and Tetanus
ECA	Economic Commission for Africa
EA	Eastern Africa regional dummy variable
ELF	Ethno-Linguistic Fractionalization
FAO	Food for Agricultural Organisation
FAG	Female in agriculture
FPST	Female Primary School Teacher
FSV	Female enrolment in Secondary Vocational
GDP	Gross Development Per Capita
GNI	Gross National Income per capita
GPI	Gender Parity Index
GOS	Girls Out of School
HE	Health Expenditure per capita
HPI	Human Poverty Index
IDASA	The Institute for Democracy in South Africa
IIAG	Ibrahim Index African Governance
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
ILO	International Labour Organisation
MDG	Millennium Development Goals
MPH	Mobile Phone Subscribers
MWBA	Married Women can open Bank Account
NGO	Non-Govermental Organization
OECD	Organisation for Economic Cooperation and Development
OOSC	Out Of School Children
ORP	Orphans 0-17years currently living
PSE	Primary School Enrolment
PLG	Persistence to the Last Grade of primary school
PPP	Purchasing Power Parity
PRD	Paved Roads
RS	Rural Sanitation
RFM	Ratio of Female to Male Labour Force Participation Rate
SACMEQ	Southern African Consortium for Monitoring Educational Quality
SA	Southern Africa regional dummy variable
SSA	Sub Saharan Africa
2SLS	Two Stage Least Square
3SLS	Three Stage Least Square
U5MR	Under Five Mortality Rate
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific & Cultural Organisation
USAID	United States of America International Development
WF	Wood Fuel
	West African dummy variable

ABSTRACT

A majority of Africa's disadvantaged children have one or more characteristics. They are – rural, malnourished, orphans, invisible, out of school, child brides or child labourers, have illiterate mothers who were denied access to productive resources, have mothers who watch helplessly as their children waste away and die of easily treatable illnesses. Our objective is to analyse factors affecting child poverty, factors like women's low status because the wellbeing of children cannot be separated from that of their mothers; child poverty is inseparable from mothers' poverty. The analysis has been done through the investigation of questions like: which are the most important variables affecting child poverty; does the lack of access to education cause child poverty or does child poverty cause the lack of access to education; to what extent can the low status of rural women be considered as a contributing factor to child poverty and Africa's progress in child poverty issues, and differences in progress between lower and lower middle income countries; under-five mortality rate (U5MR) above and below 10% countries and region wise differences. An investigation of 30 African countries between1990-2010 has been undertaken. Due to the nature of multiple interdependencies among factors affecting child poverty, the principal component analysis statistical technique (PCA) was applied to eliminate redundant variables and to retain those that explained most of the variations in the dataset.

Results of the descriptive analysis found that: rural children are largely underweight as compared to urban children, at the same time there is higher percentages of U5MR among rural children than among urban children. The analysis showed that school attendance of students aged 6-10 and 11-15 is declining. The reasons contributing to children being out of school are lack of money to pay school fees, dislike of school and poor performance in exams. There are higher percentages of rural women without access to productive resources in comparison to urban women. The results reveal that women have high illiteracy rates, low percentages accessing land, credit and health facilities; low percentages participating in decision making; and high gender inequality in the labor market. U5MR are higher in households where women have no final say in decision making as compared to households where women have a final say in at least three decisions. The highest percentage of underweight children (CU) are those who are born very small followed by mother's nutritional status, mothers with body mass index below 18.5 accounted for 31% of CU.

In addition to PCA, the issue of endogeneity led to the use of 3SLS simultaneous equations and fixed effects methods. The results of the econometric model suggests that the causality between child poverty and lack of access to education is bi-directional. Although education plays a crucial role in the pathway out of poverty, the order of elasticity ranking shows that female employment in agriculture (FAG), women's access to credit, institutional quality (IIAG) and CU are more potent in explaining child poverty than primary school enrolment (PSE). As much as child poverty plays a determinant role in children's access to education, the elasticity ranking indicates that the effect of child poverty on PSE is not as potent as that of the crop production index (CPI), CU, ratio of female to male labour force participation rate and IIAG. However, these factors are mostly influenced by child poverty, suggesting that the indirect effect of child poverty on PSE is stronger than the direct effect. The findings indicate in the order of elasticity ranking that CPI, female enrolment in secondary vocational education, wood fuel as proxy for shelter and PSE have potent effects on CU.

We used Agglomerative Hierarchical Clustering to cluster countries into lower and lower middle income; U5MR below and above 10%. Country clusters findings suggest that strategies to reduce U5MR should give due importance to women in agriculture (but has a wrong expected sign), women's access to credit channelled through women's groups, children's nutritional status and women's status. These findings apply more to lower income countries and in countries with U5MR above 10% because the estimates have shown higher elasticities under these clusters as compared to lower middle income and U5MR below 10% clusters. CPI elasticity of PSE is high in lower income cluster and U5MR above 10% cluster but has moderate effect in the lower middle income and U5MR below 10% clusters. U5MR and CU elasticity of PSE is stronger in lower middle income countries and U5MR below 10% countries. IIAG elasticity of PSE is relatively high across the clusters with the exception of the cluster of countries in which U5MR is above 10%. The estimate of CPI elasticity of CU in lower and lower middle income countries; and U5MR above and below 10% countries; and the estimate of female enrolment in vocational secondary school elasticity of CU in lower income countries, lower middle income countries (but with wrong sign) and U5MR above 10% countries suggests that strategies to reduce CU should focus on crop production and female enrolment in secondary vocational school.

Region-wise differences indicate that between1990 and 1992, Southern Africa had the lowest U5MR, while Western Africa had the highest. During 2008-2010, U5MR and CU declined across Sub Saharan Africa, as compared to 1990-1992. PSE has largely improved across Africa; however the issue is how to retain children in school till the last grade. Africa in general has very low rates of preschool enrolment particularly in Central Africa and Western Africa, these regions also have almost double the percentage number of children out of school in comparison to Eastern and Southern Africa. All regions registered a decrease in the percentage of FAG in 2008-2010. There is a wide disparity in the pattern of IIAG between Southern Africa the best performer (70%) and Central Africa the worst performer (39%). Country overall performance in child poverty determinants reveals that countries with high gender parity index (GPI) had the lowest U5MR. Countries with the highest PSE had the lowest number of CU. Countries with high IIAG and countries with high GPI had the highest PSE. Countries with low IIAG had the highest U5MR, CU and the lowest PSE.

The findings suggest that although causes of child poverty are multidimensional and call for simultaneous solutions, estimated elasticities indicate that FAG has the greatest effect on U5MR, while CPI has the greatest effect on both PSE and CU. These findings tend to point to agriculture as the solution to child poverty issues in Africa. This is by providing an enabling environment for women in agriculture to access productive resources which will contribute to better crop production that will both increase PSE, decreases CU and in the process, reduce child poverty (U5MR). Elasticity ranking shows that what is at issue is not the effect of education on reducing child poverty or the effect of child poverty on reducing education, but the improvement of women's status particularly in the agricultural sector. Policies for long lasting solutions should highlight institutional quality as a prerequisite in child poverty reduction, it presents children and women with equal opportunities to access basic needs. Education investment should shift focus from higher investments in primary school to preschool with feeding programs to cater for underweight children because the early years of life are crucial for cognitive development which eventually enables adults to reach their full potential.

Key words: Sub Saharan Africa, child poverty, rural women, under-five mortality rate, primary school enrolment, child underweight, institutions and simultaneous equations model.

Yhteenveto

Enemmistöä Afrikan vähäosaisista lapsista luonnehtii yksi tai useampi seuraavista tunnuspiirteistä: He asuvat maaseudulla, ovat aliravittuja, orpoja, näkymättömiä, lapsimorsiamia tai lapsityöntekijöitä, eivät käy koulua. Heidän lukutaidottomat äitinsä, joilta on viety pääsy tuottaviin resursseihin, joutuvat katsomaan avuttomina vierestä lastensa kuihtuessa pois ja kuollessa helposti parannettaviin tauteihin. Tavoitteenamme on analysoida lapsiköyhyyteen vaikuttavia tekijöitä, kuten naisten alhaista statusta, sillä äidin ja lapsen hyvinvointia ei voi erottaa toisistaan. Tässä tutkimuksessa tarkastellaan seuraavia kysymyksiä: mitkä ovat lapsiköyhyyteen eniten vaikuttavat tekijät, ja aiheuttaako koulutuksen puute lapsiköyhyyttä vai johtuuko koulutuksen puute lapsiköyhyydestä? Lisäksi tarkoituksena on analysoida, missä määrin naisten alhainen status myötävaikuttaa Afrikan lapsiköyhyyteen ja tässä suhteessa eroavaisuuksiin yhtäältä alhaisten tulojen maiden ja alemman keskitulon maiden välillä ja toisaalta alueiden välillä. Tarkasteltavana on 30 Afrikan maata aikavälillä 1990–2010. Keskiössä on lapsiköyhyys, sillä se aiheuttaa elämänpituista haittaa lasten mielelle ja ruumiille altistaen lapset myös aikuisiän köyhyydelle.

Tuloksemme viittaavat siihen, että maaseudun lapset ovat alipainoisia verrattuna kaupunkilaislapsiin, ja että alle viisivuotiaiden lapsikuolleisuus on korkeampaa maaseudulla kuin kaupungeissa. Analyysi osoittaa, että koulunkäynti ikäluokissa 6–10 ja 11–15 on vähenemässä. Syitä siihen, että lapset eivät käy koulua, ovat varojen puute koulumaksujen maksamiseksi, koulunkäynnin vastenmielisyys sekä heikot tulokset kokeissa. Niiden naisten osuus, joilta puuttuu mahdollisuudet käyttää tuottavia resursseja, on korkeampi maaseudulla kuin kaupungeissa. Tulosten mukaan naisten lukutaidottomuus on yleistä, ja suurella osalla naisista ei ole maankäyttöoikeuksia eikä mahdollisuutta osallistua päätöksentekoon tai saada luottoa ja terveyspalveluita. Epätasa-arvo työmarkkinoilla on voimakasta. Alle viisivuotiaiden lapsikuolleisuus on korkeampi niissä kotitalouksissa, joissa naisilla ei ole sananvaltaa päätöksenteossa. Suurin prosenttiosuus alipainoisista lapsista on äidin alhaisen ravitsemuksellinen tason seurauksena hyvin pieninä syntyneitä.

Vaikka lapsiköyhyyden syyt ovat moniulotteiset ja vaativat monia samanaikaisia ratkaisutapoja, löydöstemme mukaan naisten työllisyys maataloudessa vaikuttaa voimakkaimmin alle viisivuotiaiden lapsikuolleisuuteen kun taas satotasoindeksi vaikuttaa voimakkaimmin alakouluun ilmoittautuneiden määrään sekä lasten aliravitsemukseen. Näiden tulosten mukaan maatalous tarjoaa ratkaisun lapsiköyhyysongelmaan Afrikassa. Tämä mahdollistuu turvaamalla maataloudessa työskentelevien naisten pääsy tuottaviin resursseihin, mikä parantaa satotasoja ja sitä kautta lisää koulunkäyntiä ja vähentää lasten aliravitsemusta. Samalla lapsiköyhyys vähenee. Joustojen tarkastelu osoittaa, että kysymys ei ole koulutuksen vaikutuksesta lapsiköyhyyden vähenemiseen eikä lapsiköyhyyden vaikutuksesta koulutuksen puutteeseen, vaan naisten korkeammasta statuksesta erityisesti maataloussektorilla. Maatalouden roolin tärkeyttä korostavat tuloksemme satotasoindeksin vaikutuksesta koulunkäyntiin ja lasten aliravitsemukseen sekä naisten maataloustyöllisyyden vaikutuksesta lapsiköyhyyteen.

Tuloksemme viittaavat siihen, että lapsiköyhyyttä voitaisiin huomattavasti vähentää parantamalla naisten statusta maataloussektorilla, kohentuneen kasvintuotannon lisätessä koulunkäyntiä ja vähentäessä aliravittujen lasten osuutta. Voittoa tavoittelemattomien, opetustuloksiin keskittyvien ja joustavat opetusajat tarjoavien koulujen määrää tulisi lisätä, jotta koulua käymättömien lasten määrä vähenisi ja jotta myös orvot ja koulunkäyntiä työssäkäyntiin yhdistävät lapset kävisivät alakoulun loppuun, mikä taas vähentäisi lapsiavioliittoja ja lapsiköyhyyttä. Pitkän tähtäimen ratkaisujen tulisi painottaa instituutioiden laatua lapsiköyhyyden vähentämisen perusedellytyksenä, sillä instituutioiden kautta lapsille ja naiselle tarjotaan yhtäläiset mahdollisuudet ja oikeudet perustarpeiden toteutumiseen. Koulutusinvestoinneissa tulisi siirtää fokusta alakouluhankkeista esikouluihin, sisältäen aliravittuja lapsia varten laaditut ruokaohjelmat. Elämän alkuvuodet ovat ratkaisevia kognitiivisten kykyjen kehittymiselle, joka mahdollistaa aikuisiällä yksilön koko potentiaalin hyödyntämisen.

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"For the vision is yet for an appointed time, but at the end it shall speak, and not lie: though it tarry, wait for it; because it will surely come, it will not tarry", (Habakkuk 2:3).

I dedicate this thesis to Jehovah Yahweh for the many blessings undeservingly bestowed upon me. My God has supplied for all my needs according to the riches of His glory in Christ Jesus. I praise, honor and bless Your holy name for the grace, strength, good health, guidance and for making the impossibility possible. God alone is worthy of all the glory.

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1. INTRODUCTION

The continuation of this suffering and loss of life contravenes the natural human instinct to help in times of disaster. Imagine the horror of the world if a major earthquake were to occur and people stood by and watched without assisting the survivors! Yet every day, the equivalent of a major earthquake killing over 30,000 young children occurs to a disturbingly muted response. They die quietly in some of the poorest villages on earth, far removed from the scrutiny and the conscience of the world. Being meek and weak in life makes these dying multitudes even more invisible in death. UNICEF Progress of Nations 2000.

The rates of child poverty levels in Sub Sahara Africa are still rising despite the progress made over the years in the reduction of child deprivation indicators. In the quest to fulfil the Millennium Development Goal of universal primary education, a large majority of African countries had a tendency to focus on increasing primary school enrolment rates at the expense of preschool enrolment rates. This is evidenced by the substantially low preschool enrolment rates across the region of Sub Saharan Africa (Murungi 2012). The success of Sustainable Development Goals ranging from ending poverty and hunger to improving health and education which have been built on Millennium Development Goals largely depends on the access to good quality education.

Sub-Saharan Africa's women who have limited access to productive resources are generally characterised as malnourished and most probably give birth to undernourished children. This set of children tends to have cognitive disabilities which require early development in order to reverse their underdeveloped status. Enrolling underdeveloped children directly into primary schools without first having them receive preschool education has contributed considerably to their poor performance at school which as a result has led to high repeat and dropout rates (Heckman 2006). This phenomenon of interrelated chains of reaction has largely contributed to the increasing numbers of out-of-school children (UNESCO 2012), who most likely grow up into poor adults consequently undermining education's potential for breaking the cycle of poverty.

1.1 The definition of poverty

There is no uniform approach for defining poverty and child poverty. The notion of poverty to some implies lack of income, while to others, in addition to lack of income, poverty means the lack of the basic needs of life. This study uses few examples of poverty definitions to show what poverty means to different people.

Sen (1999:87) sees poverty "*as the deprivation of basic capabilities rather than merely as lowness of income, which is the standard criterion of identification of poverty*". Sen acknowledges the links between low income and poverty, but sees poverty as the deprivation of the capability to be healthy, to be well nourished and to live a long life, to be educated, to be employed, to participate in the community, and to have self-respect. Income poverty and capability poverty are interrelated; for example, a healthy person has the ability to develop their human resources such as skills and education, and this will ultimately increase his ability to earn an income and therefore receive freedom from income poverty. And this in turn gives them the ability to access the capabilities that were denied him because of low income. Provision of public services like healthcare and education will most likely give the poor the option and ability to escape from poverty. However, it should be

noted that the justification of investment in health and education should not be under the pretext of reducing income poverty, but should be to enable people "*to lead lives that people have reason to value*" (Sen 1999:109).

The United Nations Development Programme (UNDP) has defined poverty in the following way-"*If human development is about enlarging choices, poverty means that opportunities and choices most basic to human development are denied. Thus a person is not free to lead a long, healthy, and creative life and is denied access to a decent standard of living, freedom, dignity, self-respect and the respect of others. From a human development perspective, poverty means more than the lack of what is necessary for material well-being*" (UNDP 1997). Sen's definition of poverty (capability approach) has influenced UNDP's definition of poverty and produced an important impact on UNDP's research in coming up with a Human Development Index (HDI) and Human Poverty Index (HPI). This is reflected in an HPI which consists of three indicators- longevity, knowledge and a decent standard of living.

The World Bank has defined poverty as follows-"*Poverty is hunger. Poverty is lack of shelter. Poverty is being sick and not being able to see a doctor. Poverty is not having access to school and not knowing how to read. Poverty is not having a job, is fear for the future, living one day at a time. Poverty is losing a child to illness brought about by unclean water. Poverty is powerlessness, lack of representation and freedom"* (World Bank 2005). The World Bank's definition of poverty shows how poverty reduces the dignity of the poor to nothingness, it leaves them disempowered without control over their lives, consequently resulting in living a life trapped in poverty woes and vulnerability.

1.2 Earlier definition of child poverty

There is a large body of studies on poverty in general such as those by Ravallion (2013) and Collier (2007), but few focus on a definition of child poverty from the multidimensional aspect by highlighting children's multifaceted basic needs as the focal point of their discussions. UNICEF's working definition of child poverty presented in The State of the World's Children 2005 *is: "Children living in poverty [are those who] experience deprivation of the material, spiritual and emotional resources needed to survive, develop and thrive, leaving them unable to enjoy their rights, achieve their full potential or participate as full and equal members of society*" (UNICEF 2006). UNICEF's definition implies that the factors behind poverty experienced by children are interrelated. For example, deprivation of nutritious food leads to malnutrition which consequently affects health and education, and this effect eventually impedes a child's development. Lack of financial resources obliges children from poor households to engage in child labour, and this may negatively affect a child's mental and physical development by depriving them the right to be educated. In addition to economic security and access to basic services, discrimination and exclusion are central to a definition of child poverty. UNICEF's definition encompasses several components of child poverty founded on human rights based approach to defining child poverty.

The Childhood Poverty Research and Policy Centre (CHIP 2004) defines child poverty as: *"Childhood poverty means children and young people growing up without access to different types of resources that are vital for their well-being and for them to fulfil their potentials. By resources we mean economic, social, cultural, physical, environmental and political resources".* This definition implies child poverty arises from growing up: (a) without financial and nutritional resources, (b) without access to quality education and life skills, health and water/sanitation (c) with parents / guardians who have no time to care for them or with a community which does not step in, in the absence of the former (d) with powerlessness and lack of voice (UNICEF 2006). The CHIP definition is all inclusive and it mentions neglected areas in budget allocations, such as sanitation and water. It also considers lack of participation and the vital role of parents and the community in nurturing children.

1.3 The definition of child poverty in the present study

There is no uniform approach for defining, identifying or measuring child poverty. However, "*the definition and measurement of children living in poverty that should be adopted must follow a rights-based approach*" (Minujin et al. 2006; Minujin, 2009). The working definition of child poverty used here is largely motivated by the purpose of this study to analyse factors affecting child poverty. Based on this background, we define child poverty by drawing from the information gathered from children's perspectives of poverty, when they were asked questions such as "what are the most important capabilities a child should have during his/her life? The answers to this question enabled child capabilities to be identified in children's view. Also considered are child rights principles and the concepts of deprivation approach in identifying and measuring child poverty.

Our definition is the following: Children living in poverty are those who are deprived of interrelated material and sociocultural resources which are economic, political, social, cultural, physical and environmental in nature and are generally known to be vital for child development.

Child poverty can be further understood by explaining the interrelated material and sociocultural resources in terms of economic, social, political and cultural institutions which generally have an influence on both material and social deprivations. For instance, material deprivation is the lack of access to financial (economic institutions) resources which are supposed to facilitate the access to basic services crucial for human development such as shelter, water, sanitation, nutritious food, health, education and recreational facilities. The availability of these services depends on the functioning of institutions in budget allocations and in provision of public services.

While sociocultural deprivations are evident through the entrenched sociocultural norms which are manifested through discriminatory and exclusionary practices, (a) discriminatory practices dictate the preference of boys over girls. For example, in accessing basic needs, boys are given priority in using family resources, like sending them to school; (b) exclusion refers to situations whereby women are constrained from accessing productive

resources, thereby limiting their role as poverty managers of their households; (c) children in their interviews complained about the low income and high unemployment levels experienced mostly by their mothers.

The working definition of child poverty used in this study is similar to the previous definitions in terms of deprivations of interrelated resources leading to multifaceted problems. However, we go a step further by highlighting institutional roles in both child wellbeing and women's access to productive resources.

1.4 Child poverty and general poverty

Surveys carried out show consensus that the number of children in income-poor households is significantly higher than in non-poor households. Income poverty is higher among families with many children because of their higher dependency ratio (White et al. 2001; Merrick 2002). In addition to this, as already mentioned, a large percentage of Africa's population are children. The incidence of poverty among children is higher than the incidence of poverty amongst the population as a whole in Africa. These facts imply that grouping child poverty together with general poverty disproportionately represents children among the poor. Also, aggregated statistics can hide changes in the situations of specific groups, including families with children. For example, even in cases where poverty rates are declining, households with many children and few assets, including education, are unlikely to be part of those emerging from poverty **(**Harphan, 2002; Sachs et al. 2004).

Grouping child poverty with poverty in general makes it become invisible in the efforts to measure and tackle poverty. Not giving much attention to child poverty leads to enormous consequences on issues like policy, income generation, the sectoral focus of poverty reduction policies and discourages a holistic vision of children and families. The issue of children living in poverty needs to be at the centre of poverty reduction strategies for they are the path to eliminating poverty from the roots. The social, political, economic and cultural obstacles that impede full incorporation of individuals into society start at the beginning of life, by creating disadvantages that accumulate and culminate in situations of vulnerability which will condemn children to a road of exclusion all through to adulthood (Minujin 1999).

Based on Minujin's argument, it can be said that childhood is an opportune time for personal, social, ethical and citizen formation aimed at building and developing oneself to be fit to face the world. However, it is also during childhood when poverty cycles can be broken. The reasons for exclusion and vulnerability are a product of accumulated disadvantages that begins at birth and strengthen with the passage of time. Childhood is the time for acquiring knowledge, fostering creativity and acquiring the tools necessary for joining the labour market in adult life.

The poverty experienced in childhood is different from the poverty experienced as an adult in the sense that children have different needs. At the same time, poverty in childhood has different causes and effects, may have an irreversible impact on children. Children differ from adults in the sense that their current welfare is a critical determinant of their future welfare, since the former affects their physiological, mental and social development in ways that determine the latter. Child poverty causes lifelong damage to children's minds and

bodies, leading them into adulthood poverty and this perpetuates the poverty cycle by transmitting it to their children (Magnuson and Votruba 2009). Therefore, poverty reduction must begin with the reduction of child poverty. Investments in children are the best guarantee for achieving equitable and sustainable human development.

There is close relationship between outcome indicators such as nutrition, health, educational status and child development. At the macro level, the aggregation of positive child development outcomes contributes to a country's present and future overall development (UNICEF 2006). For example, to experience poor nutrition as a child can prevent a child's development into a healthy adult (Ferguson et al. 2007). The timing of poverty has different consequences on children's schooling. For instance, poverty experienced during preschool and early school years tends to contribute to lower rates of school completion as compared with poverty experienced by adolescents only in later years (Brooks and Duncan 1997). Child poverty prevents children from enjoying equal opportunities, and it creates social, economic and gender disparities that ultimately contribute to the vicious cycle of poverty (Griggs and Walker 2008). All the foregoing arguments signal the fact that poverty must be measured differently for children.

1.5 What has been covered by the literature on child poverty?

The literature largely focuses firstly, on child poverty in general with minimal attention being paid to children living in poverty in rural areas (who in most cases happen to be the majority). Secondly, the link between mother's poverty and child poverty has not been given the due emphasis it should have been given. Thirdly, the emphasis has been on female education and health with minimal attention being given to their availability and accessibility. However, to have good health and education largely depends on the availability of these facilities and the means of accessing them. Fourthly, child participation in decision making on issues that affect them is largely absent. Instead, most of the knowledge on child wellbeing is based on adult and institutional requirements, and this is done at the expense of real situations which are best known by the children living in poverty. This has resulted in indicators and interventions which in many ways are irrelevant to child poverty solutions. Fifthly, although education is discussed, most attention has been on primary school, with little insight on preschool education. Female primary and secondary education is stressed but little is mentioned about women's illiteracy. And finally, the in-depth analysis of the relationship between education, health and child poverty is largely missing in the literature.

What does the present study cover? This study revisits child poverty in Sub Saharan Africa and makes up for the missing parts. This has been done firstly, by using children's views to define child poverty with insights on Sen's (1999) definition of poverty. Secondly, although there are insufficient data on child poverty in rural areas for econometric analysis, we have included rural sanitation as part of the solution, because poor sanitation largely contributes to diarrhoea which leads to higher under-five mortality rates. In addition to rural sanitation, since mother and child poverty are intertwined, rural women's status such as access to productive resources has been analysed. Thirdly, in analysing the relationship between child poverty and education, as well as

looking at primary school enrolment, out-of-school children have been included. These children not only constitute a large proportion of children living in poverty, but are also a channel for transmitting intergenerational poverty. Rural women's illiteracy has been studied as one of the barriers to their access to productive resources.

1.6 The overview of poverty

This subsection gives a brief overview of poverty. Sub Saharan Africa (which from now on will be referred to as either SSA or Africa interchangeably) is among the fastest growing regions, and between 2004 and 2014 it had an average growth rate of 5.8%. However, in 2015 Africa experienced the lowest growth since the financial crisis of 1998, when it fell from 4.5% in 2014 to 3.0 % in 2015. GDP per capita growth averaged 3.4% in 2004-2014, but fell to 1.4% in 2015 due to population growth. Africa's growth rate is still too low to make a permanent dent on human development indicators, inequality and poverty remain unacceptably high and the pace or reduction is unacceptably low. Almost one out of every two Africans lives in extreme poverty, and it has been forecast that by 2030, most of the world's poor will be living in Africa. As the incidence of extreme poverty fell from 57% in 1998 to 43% in 2012 and to 39% in 2015, it can be said that the overall economic growth is less poverty-reducing in Africa than elsewhere (World Bank 2016; Amadou 2016).

Between 1990 and 1992, 33.2% of Africa's population was undernourished, while in 2014-2016 the percentage had dropped to 23.2% (FAO 2015). Africa is the only continent known to have rising child malnutrition which causes two-thirds of child deaths. Hunger, poverty and disease are interlinked, with each contributing to the presence and persistence of the other two**.** In Africa, hunger kills more children than the infectious diseases HIV/AIDS, malaria and tuberculosis put together, UNICEF (2013). The World Health Organisation (WHO 2013), reports that globally, significant progress has been made in reducing levels of mortality among children under five years of age (U5MR). Between 1990 and 2011, U5MR declined by 41% from an estimated rate of 87 to 51 deaths per 1,000 live births. Although Africa's U5MR has declined, child mortality rates are reported to be the highest across the globe. U5MR are highest in rural areas, the reasons being that an average child living in a rural area is isolated from basic health services and adequate sanitation. These deprivations contribute to the high ratios of U5MR in rural areas which is 105 as compared to 69 deaths per 1,000 live births in urban areas (Doherty 2008; UNICEF 2009).

Africa accounts for 43 million of the 115 million children out of school, or just over one third of the total. Progress towards gender equity in primary education has produced mixed results. Of the 14 countries in the world in which girls account for less than 80% of primary school attendance, 11 of them are to be found in Africa.

The 2007 World Bank report "Global Economic Prospects" predicts that in 2030 the number of people living on less than the equivalent of US$1.25 a day will fall by half, to about 550 million. The report adds, however, that much of Africa will have difficulty in keeping pace with the rest of the developing world. Even if

conditions were to improve in absolute terms, the report warns that Africa in 2030 will be home to a larger proportion of the world's poorest people than it is today. Who are the poor adults of 2030 but the children of today?

1.7 Objectives and purpose of the study

The plight of Sub Saharan Africa's children displayed in the foregoing overview of child poverty has largely spurred the undertaking of this study. The reasons for choosing to focus on child poverty are firstly, over 50% of SSA's population are children under 18 years of age (UN World Population Prospects 2015). Secondly, the incidence of poverty among children is higher than the incidence of poverty amongst the population as a whole in Africa (Batana et al. 2013). Thirdly, as the future and wellbeing of any nation depends on the quality of life of the children of today, this implies that a nation inhabited by children whose lives are those of deprivation already, spells doom on that nation's future. And finally, to counteract the doom predicted for Africa by the World Bank (2007) report. In addition, although Sub Saharan Africa's poverty fell from an estimated 56% in 1990 to 35% in 2015, the 2015 forecasts indicate that Sub Saharan Africa accounts for a half of the global poor (World Bank 2015).

Since the incidence of poverty is higher among children than adults, this study's main objective is to analyse the factors affecting child poverty. The wellbeing of children cannot be divorced from that of their mother. A mother suffers the consequences of her children's poverty while at the same time, she transmits her poverty to them. Thus, mothers' and children's poverty are intertwined. Most of Africa's population is rural and thus there is a high concentration of poverty in rural areas (Alkire et al. 2014; Mellor 2014). In addition, a study by Gordon et al. (2003b) showed that the percentages of rural poor children severely deprived of basic needs were much higher than those of urban poor children, and U5MR are also much higher in rural areas than in urban areas (105 and 69). These facts imply that child poverty reduction calls for a focus on rural areas, since a child's poverty is inseparable from its mother's poverty, and rural women are therefore a point of reference in this study.

In Africa, women produce 80% of the continent's food, including both subsistence and market food, on small land holdings with very limited access to productive resources, land inclusive. Since rural women play a major role in both child wellbeing and agricultural productivity, the aim of this study is to understand (a) who the rural women are, (b) the linkage between a mother's wellbeing and that of her children (c) rural women's lack of access to productive resources and its subsequent effect on child poverty.

While child poverty reduction can be achieved by implementing several measures, the definition of child poverty used in this study reveals that the actions of several institutions are likely to affect child poverty. The role of any state is supposed to be demonstrated in its capacity to deliver quality services, in the existence of effective and efficient institutions, and in enabling participation of the civil society especially women and

children in matters concerning them. The mission is to analyse the effect of institutions on the delivery and access of child capability building services.

1.8 Research question

Since this study echoes Sen's definition of poverty as a deprivation of capabilities, the above objectives will be realised by answering the following research questions. (1) Which are the most important variables affecting child poverty? (a) Identify country clusters of African countries based on their factor scores in the most important variables affecting child poverty. (2a) Does a lack of access to education cause child poverty or does child poverty cause a lack of access to education? Or both and to what extent? (2b) To what extent can the low status of rural women be considered as a contributing factor to child poverty? More particularly, what is the impact of women's low status on children's health and education status? (3) What progress has there been in child poverty issues in Sub Saharan African? Are there any differences between (a) lower income and lower middle income countries, high U5MR and low U5MR countries (b) region-wise differences?

Hypotheses

The hypotheses are

(1) Lack of access to education (primary school enrolment) positively impacts child poverty (U5MR and child underweight). Child poverty (U5MR) negatively affects access to education and positively impacts child underweight.

(2) Factors that determine low status of women have a positive effect on child poverty (U5MR and child underweight) and a negative effect on education (primary school enrolment).

The factors identified as the ones affecting child poverty will be measured by statistical estimates with the help of descriptive statistics methods and econometric analysis using (a) U5MR, (b) Child underweight, and (c) Primary school enrolment as endogenous variables. Regressions will be run using panel data with the help of 3SLS simultaneous equations and fixed effects methods on 30 Sub Saharan African countries during the period 1990-2010. The aim of the estimation is to find out if the selected explanatory variables that are assumed to be negatively correlated with education have a positive effect on child poverty. The consistency of the second hypothesis will be verified by examining empirical estimates to see if variables assumed to have a negative correlation with the variable on rural women's access to resources simultaneously increase child poverty.

1.9 Significance of the study

This study revisits child poverty by measuring factors affecting it by using three endogenous variables simultaneously. As already pointed out, the reason for adopting this procedure is that factors affecting child poverty are interrelated thus there is a need to address them simultaneously. Child poverty is explained by bringing into the limelight women's adult education alongside female primary and secondary education. This study accords education its rightful position as being a solution to most of the other child deprivation indicators.

The present study is of great importance to Sub Saharan Africa as a region, to the policymakers of this region and to the organisations working towards child poverty alleviation in the region. The point to be focused on is not just poverty in general, but child poverty with highlights on primary school enrolment, out-of-school children, child underweight, rural women and institutions.

Why focus on child poverty? Poverty causes lifelong damage to children's minds and bodies, leading them into adulthood poverty and it thereby perpetuates a vicious cycle of poverty through generational transmission. Therefore, to stamp out poverty, we have to deal with it from the roots, which is child poverty. There is common consensus on the importance of education in reducing poverty. A body of studies (Appleton et al., 2009; EFA 2013; Botha 2010) explain that the lack of education in general (without detailed specifics) is one of the causes of child poverty. This study takes this point further by analysing the reasons for not being at school (out-of-school children comprises the majority of the children living in poverty) and demonstrates that the factors that keep children out of school are the same factors that largely explain child poverty. A combination of understanding the reasons for not attending school, with rural women's lack of access to productive resources and the role of institutions is most likely to improve on the findings from previous studies on child poverty.

Studies in the past on child poverty (UNICEF 2007; Hobcraft 1993; Gunes 2013; Fuchs et al. 2009) have advocated for mothers' education as a key factor in reducing child poverty. We add to the precedent findings by firstly showing that women who failed to attend school (female illiteracy) can still have a positive effect on their children's wellbeing by attending adult literacy programmes. Secondly, we emphasise that it is not enough to highlight economic policies in favour of mothers' education and health. To ensure their success, there is need for them to be backed up by social norms which are expected to be receptive to gender equality in employment opportunities and wages, in accessing credit, in accessing productive inputs and information, in inheritance rights and in power sharing such as in matters of decision making. It is not sufficient to enact laws and policies; their enforcement is also of utmost importance, and political institutions have to see to it that these laws are enforced to effect the positive changes. Thus, this study goes a step further than the previous studies by incorporating female adult literacy and the key role of good quality institutions in explaining child poverty.

Institutions are also reminded that they should include children and women in making decisions that affect their own lives in order to have their voices heard and to be part of the development process. The idea of development is to improve the living standards of all, especially those at the bottom, who in most cases happen to be women and children. It is those at the bottom who understand best their conditions and can best contribute on how to combat poverty.

The study also reminds us that from experience of history, the developed countries of the day are those that have opened their doors to women and in the process to their families at large to the accessibility of basic services. In the process of women accessing these facilities, their families benefit from health as well as

education services which in turn produce healthy and skilled labour force that is efficient and effective, leading to good quality institutions as well as to higher levels of production and hence to another round of a higher level of development.

1.10 Outline of the study

Chapter 2 investigates the questions by using this study's definition of child poverty as a platform. It analyses factors affecting child poverty by firstly explaining different approaches to child poverty, starting with the uni-dimensional approach (monetary) and then the multidimensional (deprivation) approaches such as the Bristol approach, the Young Live Project and the Children's Perspective approach formed from children's views on capabilities relevant to them, and child rights. These approaches are largely about child deprivation. Secondly, a subsection has been dedicated to a discussion on education. It deals with the effects of preschool education on children living in poverty, and primary school education in Sub Saharan Africa. Nutrition, water and sanitation are also discussed. The wellbeing and productive roles of rural women are investigated in gauging the interlink between child poverty and mother's poverty, the focus is on the duties of rural women, women's health, education and access to productive assets. The quality of institutions and child poverty are covered with due attention being given to public expenditure since it represents the institutional role in supplying resources essential for the development of children's capabilities. Other institutional issues affecting child poverty such as governments' commitment to children's rights are addressed. The impact of economic growth on child undernutrition, women's status, agricultural productivity and the incomes of the poor is addressed.
Chapter 3 is about the conceptual framework on the factors affecting child poverty. This chapter conceptualises the factors discussed in Chapter 2 with a focus on child health (child underweight), child education (primary school enrolment) and U5MR (child poverty). Women's status, institutional quality and other factors affecting child poverty are analysed.

Chapter 4 discusses methods, the econometric model, and data, it presents both reduced form and general equations of the econometric model. 2SLS and 3SLS methods are explained. Endogeneity, fixed effects are explained. A subsection on data and construction of variables shows the list of countries under observation, defines variables under study and the expected signs. And finally, a summary of descriptive statistics has been presented.

Chapter 5 is a descriptive analysis of factors affecting child poverty. Identification of children in poverty is done with the help of the child perspective approach. Variables with data for long time periods have been measured with the use of an econometric model in Chapter 6. The variables that contribute to factors affecting child poverty but for which short time period data are available have been analysed with the application of descriptive statistical techniques with the application of principal component analysis (PCA) and clusters. The country PCA scores have been applied to cluster countries using agglomerative hierarchical clustering.

In Chapter 6, empirical results from the estimations of simultaneous equations using 3SLS and fixed effects panel data methods are presented. U5MR is used as a proxy for child poverty, the other dependent variables being primary school enrolment and child underweight. Estimations were made by using factors affecting child poverty derived from the conceptual framework in Chapter 3 as independent variables. Regressions were run on 30 Sub Saharan African countries during the period 1990-2010. The results are presented in tables and figures. The second part of Chapter 6 is on Africa's performance and progress in child poverty issues, results of country clusters into lower GNI per capita and lower middle GNI per capita, U5MR above 10% and U5MR below 10% and region-wise comparison of Africa's performance are presented.

Chapter 7 is the conclusion and presents the major findings and their implications. Contributions and recommendations to ongoing debate on child poverty in Sub Saharan Africa are discussed.

2. LITERATURE REVIEW OF FACTORS AFFECTING CHILD POVERTY

"There is a spectre haunting child wellbeing in the world today. It is bad governance-governance that serves only the interests of a narrow ruling elite. Governance that is drenched in corruption, favouritism and abuse of poor. Governance that is not responding to the massive and long deferred social agenda of reducing inequality and unemployment and fighting against dehumanizing poverty. Governance that is not delivering broad improvement in people's lives because it is stealing, squandering, or skewing the available resources" (Diamond 2007).

This chapter surveys the literature on poverty, with a focus on child poverty. To understand child poverty calls for a definition (see Chapter 1), concepts and the measurement of child poverty in order to identify the children living in poverty. We started off by discussing the differences between general poverty and child poverty, followed by uni-dimensional measure of child poverty (monetary approach), after which we proceed to analyse multidimensional measures of child poverty. Since child poverty has to do with deprivation of basic capabilities, this study has used selected readings that focus on child poverty (child deprivation) with insights into basic capabilities. These approaches are generally referred to as deprivation approaches, and among them are the Bristol approach, the Young Lives Project and the Child's Perspectives approach.

Indicators to measure child poverty under the child's perspective approach are discussed under several sub sections starting with education, nutrition, water and sanitation. The subsection on rural women portrays their characteristics which largely contribute to their low status. The subsequent subsection starts off by introducing the foundation of institutions in Africa, for this sets the scene in explaining the actions of institutions in creating an enabling environment for women and children to live lives free from poverty. The foundations of institutions give a better understanding of why some institutions act as boosters of growth, while the actions of other institutions not only decrease growth, but also indirectly increase child poverty in Africa. The ability of children to be healthy and to be educated (among other capabilities) is determined by economic, social, political and cultural institutions, which allocate and provide the necessary services to enhance these capabilities. Institutions provide services to children through the mechanism of public expenditure directed to areas which positively impact children's capabilities. The effectiveness of public expenditure is examined through the question – have the children benefited from public spending?

A child or their household is considered to be poor if they have both a low standard of living and a lack of resources over time. A household with low consumption expenditure, equals a low standard of living (Gordon et al. 2003b). Monetary measures of child poverty identify poor children (households) by the percentage of the population who are living in a household with the income or consumption expenditure of which is below the established poverty line. The poverty line is a monetary cost to a given person, at a given place and time, of a reference level of welfare (Ravallion 1998). It is assumed that rising economic growth (GDP per capita) leads to rising incomes, subsequently leading to better standards of living of households, and this includes the children in these households. GDP per capita is a basic economic indicator that measures the level of total

economic output relative the population of a country. It reflects changes in the total wellbeing of the population (Kenny 2008; Saunder et al. 2002). Based on this assumption, we review the literature on the relationship between economic growth and child poverty; and the impact of institutions on both economic growth and child poverty.

2.1 Monetary approach

The monetary approach is uni-dimensional; it uses levels of households' income to measure poverty. Incomes of the poor have been tracked down by answering questions such as: who is poor? Absolute poverty and relative poverty standards have been applied as measures of poverty. Absolute poverty is defined in reference to a poverty line that has a fixed purchasing power determined in a way to cover needs that are physically and socially essential. The list of these needs is what constitutes the poverty line (Foster 1998).

Absolute poverty lines are not necessarily equal across countries since basic needs are bound to differ. Under relative poverty, the poverty line is not established in terms of basic needs but as a fixed proportion of some income standard in the population, for example the mean or median income. However, fixing the poverty line relative to average income is likely to show rising poverty even when the standard of living of the poor has in fact risen (Bourguignon 2003). Poverty reduction in any given country at any given point of time is fully determined by the rate of growth of the mean income of the population and the change in the distribution of income.

The poverty line of between US$1.25 and US$2 a day is the international benchmark for defining the extent of poverty in developing countries. It is based on studies conducted during the 1990s in ten low-income countries such as Bangladesh, India, Kenya and Tanzania. The analysts concluded that the cost of a minimum basket of goods and services was approximately equivalent to US$1.25 a day per person, when expressed on purchasing power parity in 1985 (Vandemoortele 2000 and 2009). This kind of measurement is likely to exclude the majority of poor persons, due to estimations based on partial data.

Does the US$1.25 a day actually measure poverty or does it simply measure how many people are struggling to survive every day on less than US$1.25? The US$1.25 measurement violates the standard definition of income poverty under which a person is said to be poor, when he/she fails to reach the minimum level of economic well-being set by society. The poverty line cannot be treated differently from the average standard of living of the group. As countries become wealthier, societies gradually adopt higher minimum levels of economic well-being. This implies that for the purpose of measuring poverty over time or for comparing poverty across countries, the measurement cannot be kept static and applied uniformly to all societies. An alternative is to employ a country's own poverty standard in identifying the poor. This too has its drawbacks, as it is likely to introduce country-specific, individual peculiar elements into the choice of the poverty line. In turn, this may lead to suspicious cross-country results (Foster and Szekely 2008).

2.2 Deprivation approach

Discussions in Chapter 1 section 1.4 on child poverty and general poverty concluded that child poverty must be measured separately from general poverty. Under multidimensional measures of child poverty, it is often measured with the help of deprivation indicators. Deprivation is defined as a state of being disadvantaged relative to the local community, or the wider society or nation to which an individual, family or group belong. Deprivation is associated with unsatisfactory and undesirable circumstances, whether material, emotional, physical or behavioural. Deprivation involves a lack of something generally held to be desirable such as adequate income, good health, education, and participation in society (Brown and Madge 1982, and Townsend 1987). High deprivation is equivalent to a low standard of living, whereas under unidimensional measure of child poverty, low consumption expenditure equals low standard of living. Deprivation indices are broader measures for they are more inclusive and reflect different aspects of living standards including personal, physical and mental conditions, local and environmental facilities, and social activities and customs (Gordon et al. 2003a). The deprivation approach is one of the measures that is specific to children's needs and focuses on them. Under the deprivation approach, we have analysed three approaches: the Bristol approach, the Young Lives Project and the Child's perspective approach.

2.2.1 The Bristol study deprivation approach

The Bristol study measurement of child poverty is also consistent with the capability approach. According to UNICEF (2005), "*The notion of deprivation focuses attention on the circumstances that surround children, casting poverty as an attribute of the environment they live and grow in*". The Bristol measures of child poverty are based on child rights and on definitions of poverty internationally agreed on at the 1995 World Summit for Social Development. The Bristol study analyses child poverty by measuring deprivation indicators such as education, health, food, information, safe drinking water, sanitation and shelter (Gordon et al. 2003a). A child is said to live in absolute poverty if he/she has two or more deprivations.

The Bristol group with the help of data from a household survey conducted an empirical study on how children fare with respect to the seven deprivation indicators in all developing countries. Their findings were that 56% of children in low and middle income countries suffered from one or more forms of deprivation. South Asia and Africa had deprivation rates of more than 80%. Rural children in these two regions suffered deprivation rates of more than 90% (Gordon et al. 2003a).

Approximately 1.8 billion children in low and middle income countries experienced deprivation as follows: 15% of under-fives were food deprived, 20% either did not have access to water or had to walk more than 15 minutes to access safe water, 31% suffered from sanitation deprivation, 15% from health deprivation, 34% from shelter deprivation, 13% of those aged 7-18 had not been to school and 25% suffered from information deprivation (Gordon et al. 2003b).This report indicates that poor shelter and sanitation take the lead in the deprivations experienced by children, whereas education and health which feature most in poverty alleviation strategies were only half the percentages of shelter and sanitation. Minujjin et al. (2006) argue for localised

deprivation, such as undertaking analysis focused on gender, due to the fact that girls and boys face different conditions in terms of various deprivations.

2.2.2 Young Lives Project

This is a project managed by the British Department for International Development (DFID). This project investigates the changing nature of child poverty, by analysing the causes and consequences of child poverty. The Young Lives project focuses on filling in the information gap on the changes in children's well-being over time. It did this by putting under observation about 12,000 children and their families for over 15 years in Ethiopia, Peru, Vietnam and India (Camfield et al. 2008).

The project aimed to examine all aspects of children's lives including: (a) access to basic services such as electricity, safe drinking water and sanitation, (b) access to healthcare and children's health: vaccination, prevalence of childhood diseases, distance to medical care, (c) childcare and child rearing, (d) child malnutrition, (e) literacy and numeracy, (f) child work and (g) social capital among the community (UNICEF 2006).

The Young Lives project carried out empirical regressions on the children chosen, every three years, to analyse deprivation indicators. The empirical results of the first attempt revealed that in all four countries, children experienced high levels of deprivation from basic needs such as clean water, quality education, electricity and proper shelter. Countries like Ethiopia had an infant mortality rate of 116 deaths per 1,000 live births in 2001 compared with the regional average of 107. Only 34% of children aged 7-12 were enrolled in primary school in 2000 (UNDP 2004:5, REF. UNICEF 2006). The study pointed out that deprivation was more prevalent among rural children, particularly girls.

The Young Lives project covered areas that are crucial to children's wellbeing that did not feature in the Bristol study, such as childcare, child work and childrearing. Girls' education is affected when girls take up the roles of childminders while their parents take up other family activities. This mostly happens because childcare centres are not common in Africa and even if they existed, poor families would not be in a position to afford them. Childrearing is crucial in child wellbeing, and this claim is strengthened by common cases where children suffer and some eventually die because their parents lack knowledge on child rearing. The Young Lives Project also addresses social capital which is of great significance in the community. Finding ways and means to bring together members of the community with a common cause such as children's wellbeing is sure to produce positive outcomes in alleviating child poverty. In addition to this, the study will enrich knowledge, because by following up a set of children for a period of time, the study is in a position to determine any changes in the causes and consequences of child poverty, and this will guide policymakers and budget allocation authorities to address directly the special needs of children.

2.2.3 Child's perspective deprivation approach

The Child's perspective deprivation approach is founded on children's views about living in poverty gathered from them during an interview. Details of the interviews will be explained in the course of the study. This approach is an extension of both Bristol and Young Lives deprivation approaches. For instance, it applies the same child deprivation indicators that are in the preceding deprivation approaches but also incorporates the effect of women's status and institutions that are missing from the preceding deprivation approaches. However, this approach has not followed the same children for a specified period as was done in the Young Lives Project, the reason being that the kind of data available did not permit that kind of procedures. The Child's perspective approach draws insights from child rights and Sen's capability approach.

(a) Child poverty and child rights

Human rights have come to play a central role in discussions about economic and social developments because: (i) they have been ratified by the great majority of the governments in the world and therefore can be said to embody universal values and aspirations and (ii) they provide a "*normative framework of obligations that has the legal power to render governments accountable*" (Lee 2009). The Convention on the Rights of the Child, (hereafter referred to as CRC) contains 42 detailed provisions enshrining the rights of children in all areas of their lives. CRC is the first binding instrument in international law that covers the economic, social, cultural, civil and political rights, including special protection measures for all persons under 18 years of age (Lee 2009). Almost all the articles in the CRC address the issue of child poverty and its consequences, either directly or indirectly. CRC ensures that children are not deprived of access to clean water, sanitary facilities, shelter, healthcare services, education and information (Gordon et al. 2000). These are the same issues at the core of child poverty definition from children's perspective.

(b) Children's views on what the institutions are doing for them.

The African Union organisation reviewed its progress towards an "Africa Fit for Children", Plan International an organisation that works with disadvantaged children presented the views of 1,000 children from 30 countries across the continent. The children's verdict was that adults had not kept their promises nor had they sought their expertise and opinions about what adults had been doing for them. They added that there was an increasing divide between children in urban and rural areas. Rural children talked of being 'left behind', of suffering from poor health, receiving poor education services as well as low income. They talked of poor access to immunization programs, the high cost of food due to inflation; mismanagement and poor distribution of preventive and curative resources like impregnated nets and drugs. Children noted the growing inequality, for instance while private schools improve, the quality of state education was falling due to the poverty in their communities, insufficient school infrastructure and poor quality education staff. They further complained that marginalised groups were being left behind, particularly that those living with disabilities more often miss out completely on access to education and lifesaving services (Khanna 2007).

Witter and Bukokhe (2004), carried out interviews on children's perceptions of poverty, participation and local governance in Uganda. This was done across three clusters: Cluster A consisted of 662 children (54% male

and 46% female) aged between10-14. These children came from sub-counties in five districts of Uganda, and the invitation to participate was through local schools, councils and community based organisations (CBO). Children thought to be facing particular difficulties such as having disabilities, being head of household, orphans, coming from single parent households, not getting support from parents or guardians, being affected by HIV/AIDS, or being street children were targeted. Those affected by war were also involved in separate discussions as well as being included in the general sessions. Cluster B comprised 48 technical staff and local officials, 216 parents and 15 CBOs/NGOs representatives. The theme in this cluster was on trends in different categories of vulnerable children. Cluster C consisted of 116 children ages 10-19, 71 parents/guardians and 21 officials. These groups were sampled from three districts and from the National Rehabilitation Centre (which takes children from all over Uganda). The theme in this cluster was to investigate the level of deprivation amongst children convicted of petty criminal offences.

The findings from children's responses were similar to those given by children from "Africa Fit for Children" however, they stressed the fact that it is crucial to deal with child poverty issues separately from general poverty. The other remarkable addition was that children wanted to be trained in life-skills so that they could also be part of a solution in reducing their poverty by working. They also wanted to be part of the committee overseeing the running of school funds, participating in local council meetings with the object of presenting their views on what should be done in order to improve their wellbeing (Witter and Bukokhe 2004).

It can be concluded that children's views were mostly concerned with matters pertaining to their wellbeing (basic needs) such as access to education, healthcare, income and food. Child wellbeing describes the quality of childhood as lived, and wellbeing draws in the many different factors which affect children's lives. Child poverty influences each aspect of wellbeing and is a major impediment to delivering better wellbeing (Camfield et al. 2008). A lesson learnt from children's views is that efforts in pursuit of child poverty alleviation need to take into account children's opinions and work with them in ensuring their recommendations are realised.

(c) Children's capabilities

Recognising children's rights implies acknowledging human rights as a matter of entitlement which demands and commits those concerned to create an environment that enables children to enjoy their rights. Children's views of their wellbeing are consistent with Sen's capability approach which is similar to the basic needs approach (for it puts emphasise on non-monetary aspects of poverty) in measuring poverty. The capability approach states that capability is firstly, the ability to be healthy which depends on the ability to acquire food, access health services, access education, the ability to live in adequate space and the ability to live in a clean environment. Secondly, the ability to be educated which depends on access to educational services and on the ability to be healthy. And finally, there is the ability to engage in productive employment which depends on the first and second abilities, but also depends on the ability to access employment and the ability to access credit (Sen 1999).

Since children are subjects of capabilities, the capability approach can be used to measure child poverty. Capabilities are people's potential functionings. Functionings are being and doing. The difference between a functioning and a capability is like the difference between an achievement and the freedom to achieve something, or between an outcome and opportunity (Biggeri et al. 2005). Functionings are what we achieve and capabilities are the freedom to achieve these functionings. What matters for children's wellbeing are the children's functionings and capabilities, and this brings us to the question what are children able to do and to be? Answers to this question start by acknowledging the revelation that the capability approach recognises the fact that human wellbeing is multidimensional and the relevant capabilities are complementary and should advance at the same time.

Biggeri et al. (2005) point out five important aspects related to children's capabilities. We mention here three of the five, the first being children's capabilities and functionings may be constrained by their parents' decisions. Children's capabilities are different from those of adults and vary depending on the child's age. Secondly, different capabilities and functionings are closely interrelated, the failure of one is likely to affect the performance of the rest within the chain. Thirdly, a child's capabilities are affected by the intergenerational transfer of capabilities and functionings, and the achieved functionings of their parents, as an outcome of a cumulative path dependant process that can involve several generations of human beings. In this respect, one can argue that a child as a future parent is at the centre of intergenerational transfer of capabilities, implying that children are a key resource for a better future.

(i) A list of children's capabilities

We have used Di Tommasso's (2006) list of child capability to measure child wellbeing and Biggeri et al. (2005) who identified a list of children's central capabilities regardless of their age and sex. (1) Life: being able to be born and being able to enjoy a life of normal length. (2) Bodily health: being able to have good health, to be adequately nourished. (3) Shelter and environment: being able to have good shelter and access to clean water and good sanitation as well as to live in a safe and pleasant environment. (4) Education: being able to be educated. (5) Senses and imagination: being able to use senses to imagine, think and reason, be informed and cultivated by an adequate education including by no means limited to literacy and basic material skills. (6) Leisure activities: the capability of playing is threatened by child labour. (7) Social interaction: being able to be part of a group, to interact with other children. This capability depends on other capabilities like the capability to play, the capability of thought and of having emotions. (8) Participation: to participate in and have a fair share of influence and being able to receive objective information. The list goes on, but we focus on those capabilities that not only feature in CRC but are also of more relevance to the aims of this study.

(ii) Children's opinions on capabilities

Children's World Congress on Child Labour (CWCCL) hosted in Florence Italy in May 2004 invited around 200 children mostly between the age group 14-17 years from different regions, countries and organisations to be the main speakers. Most of the child delegates were former child labourers and activists, implying that they understood better than adults the children's attitudes about how a child's life should be. The mission of child

delegates was to express their opinions and to identify their capabilities. Focus Group Discussions with the help of a questionnaire generated the results reported in percentages in a table format, as shown in Table 2.1 (Biggeri et al. (2005).

Table 2.1 Rating of relevant child capabilities from children's view

RELEVANT CAPABILITIES	Question	Important or very important	Indicate 3most relevant
(1) Life and physical health	To be able to enjoy good health	97.1	35.8
(2) Mental wellbeing	To be able to feel happy	97.1	10.1
(3) Bodily integrity and safety (e.g. healthy food)	To be able to keep bodily integrity	93.3	6.2
(4) Social relations	To be able to participate in the activities of your family and neighbourhood.	92.3	4.1
(5) Participation/ information	To be able to express your personal opinion and ideas and be listened to.	98.1	19.3
(6) Education	To be able to attend school	98.1	74.8
(7) Freedom from economic and non-economic exploitation.	To be able to be free from any form of exploitation.	99.1	23.4
(8) Shelter and environment	To be able to live in a comfortable and clean environment	95.2	14.1
(9) Leisure activities	To be able to play	98.1	25.0

Source: Biggeri et al. (2005).

From Table 2.1, it is evident that the child delegates highly rated all the relevant capabilities as being very important, exceeding 90% in all cases. However, for the sake of comparison, their responses demonstrate that the three most relevant capabilities are education which is outstanding with 75% scores, followed by health with 36% of scores, leisure with 25% of scores. Social relations took fourth position, ahead of information (fifth) and shelter (sixth).

Biggeri et al. (2005) further carried a discussion with a representative number of children to discuss each capability according to the age categories suggested. The children discussed the capabilities and reached a common position and attributed each capability according to the age of the child. The ages were divided into 0-5 years, 6-10, 11-14 and 15-17 respectively. All the capabilities were reported to be of relevance across the age groups with the exception of education and participation / information which were found to be of less relevance to those in the 0-5 age bracket. Leisure activities such as play were reported to be very relevant to all the age brackets with the exception of 15-17 age bracket where leisure was said to be only 'relevant'. This suggests that the importance of some capabilities does not appear to be identical at every stage of the life cycle. Therefore, the relevance of every capability must be examined according to age and stage of the life cycle (a child, teenager).

(d) A workable measure of child poverty using a child perspective deprivation approach

Children's capabilities reaffirmed by the children themselves can be used as indicators to measure child poverty and identify the needs of poor children. There are three major arguments in favour of adopting a capability approach to measure poverty: Firstly, the approach concentrates on deprivations that are *intrinsically* important (unlike low income which is only *instrumentally* significant). Secondly, besides the lowness of income, there are other influences on capability deprivation (income is not the only instrument in generating capabilities). Finally, the approach notes that the impact of income on capabilities is contingent and

conditional; this implies that different individuals, communities and countries may need different levels of resources to achieve the same capability (Sen 1999: 87-88).

The capability approach is challenged, however, on the grounds of the difficulties with converting a set of capabilities into a set of measurable indicators. This problem can probably be solved by converting these basic capabilities into the conventional indicators such as: (a) life-life expectancy, infant mortality, under five mortality; (b) health- morbidity, immunisation, birth attendant, water and sanitation; (c) bodily integrity and safety (e.g. healthy food): underweight, stunting, wasting; (d) participation/information: birth registration-civil rights, political rights, radio, television and telephone, (e) education: enrolment and completion rates. (f) shelter: wood-fuel, kind of shelter, water and sanitation; (g) leisure: child labour. Regressions on the fore mentioned conventional variables can gauge child poverty. Thus, the capability approach can be applied to define and measure child poverty from children's perspectives.

Table 2.2 is a compilation of selective views on the comparison of monetary approach and deprivation approach measures of child poverty.

Table 2.2 A comparison of monetary and deprivation measures of child poverty

	Monetary approach	**Deprivation approach**
Dimension of measurement	One dimensional	Multidimensional, consists of material and non-material
Data coverage	Household data which excludes - orphans, abandoned and street children, children from illegal immigrants	Household data which excludes orphans, abandoned and street children, children from illegal immigrants
Characteristics	(1) Identifies and measures general poverty. (2) Child poverty is not measured separately, but its extent is approximated from household studies.	(1) Identifies and measures child deprivation. (2) Focuses on the multifaceted basic needs of children with multidimensional solutions.
Strengths of the approach	(1) It focuses on individuals' income not on basic needs which are not easily quantifiable in monetary units.	1) The estimator of child deprivation is higher than the income poverty measures (2) Provides straightforward numbers in various domains (3) Considers the importance of public services and goods in the realization of a minimum standard of living.
Weakness of the approach	(1) "Dollar a day" only fails to distinguish children from adults. (2) It underestimates child poverty. (3) The disaggregation from household to individual (child) level is based on strong assumptions. (4) Due to no information on consumption on individual household members, it assumes equal distribution of household resources. (5) Provides no details of children's situations like: income/consumption expenditure needs, and how these needs may vary by age, gender and location.	(1) Is not age specific- different issues are relevant for children at different ages. (2) Depth of severity of poverty gives a biased picture as different numbers of deprivation can be observed for children in different age categories.
Applicability	(1) Output consists of clear figures, useful for policy and poverty monitoring and international comparisons.	(1) Can be used to monitor progress or report deteriorations in fields of development. (2) Enables budget allocation and public service provision to cover deprived children who would otherwise have been left out under monetary approach.

Source: Gordon et al. (2003a), Sen (1999), Biggeri et al. (2005) and Minujin et al. (2006).

(e) Multifaceted needs that are complementary calls for multifaceted solutions

Why use a deprivation approach technique for estimation? There is consensus that child poverty means more than just income poverty, and this is reaffirmed by observing one of definitions of child poverty –

"Children living in poverty are deprived of nutrition, water and sanitation facilities, access to basic health-care services, shelter, education, participation and protection, and that while a severe lack of goods and services hurts every human being, it is most threatening and harmful to children, leaving them unable to enjoy

their rights, to reach their full potential and to participate as full members of the society" UN General Assembly definition of child poverty (UNICEF 2007).

UNICEF's (2007) definition clearly brings out a list of basic needs that children living in poverty are deprived of. These basic needs are vital to children's development, the absence of any of them retards their human capability development, which in turn eventually limits children from being part of the economic, social, political and cultural functionings of society. Besides lack of money, child poverty involves all the complementary factors that are interrelated such as health, nutrition, water, sanitation, shelter, information and education. A child's wellbeing is largely determined by the availability and quality not only of basic services, but also the availability of an environment for play and leisure. Access to all these services does not necessarily depend on the family's income but on the capacity and willingness of the state to provide them in a manner that will ensure that poor children are not sidestepped. The presence or absence of anyone of these factors can be effectively and efficiently gauged by measuring them the way they are.

These arguments suggest that child poverty cannot be fully analysed and measured by a monetary approach. A true picture of child poverty analysis and measurement can largely be ascertained by the deprivation approach. The arguments are based on the understanding that children's multifaceted needs which are complementary are not easily identifiable by income poverty measures (single approach) but calls for a multidimensional approach such as the deprivation approach. Batana (2013) estimated multidimensional poverty among women in 14 African countries based on four dimensions: assets, health, schooling and empowerment. When he compared multidimensional poverty estimates with the Human Development Index, the Income Poverty Index, asset poverty and the Gender-related Development Index, the results indicated that the inclusion of additional dimensions into the analysis leads to country rankings that differ from those obtained with the mentioned four measures. He found that the lack of education was the highest contributor to poverty, and he reported that all the countries under investigation indicated that body mass index (BMI) is the dimension in which women are deprived the least. This finding however contradicts the existence of the high percentages of underweight children across Africa, attributed partly to the interrelationship between maternal and child nutritional status.

2.3 Indicators to measure child poverty under child perspective deprivation approach

Child poverty is mostly a result of the deprivation of indicators mentioned in the foregoing deprivation approaches. This section presents discussion on selected deprivation indicators in the context of measuring child poverty under the child perspective deprivation approach.

2.3.1 Education and child poverty

(a) Effects of preschool education on children living in poverty

"*A relation between poverty and suboptimal cognitive development and academic failure is well established, although the process and mechanism remain poorly understood*" (Campbell and Ramey 1994). The early years of life are crucial in the development of a person's mental and physical health which eventually enables a

person to reach his/her full potential. Despite the criticality of the early years of life, the majority of Sub Saharan Africa's[1] children suffer from malnutrition, poor health, and lack both cognitive and non-cognitive stimulation. Over 60% of children in Angola, Malawi, Uganda, Tanzania, Ethiopia, Niger, Nigeria, Burkina Faso, Mali and Zambia fail to reach their full potential. The estimated loss in productivity is more than 20% of yearly adult income when underdeveloped children become adults (Engle et al. 2007). Inadequate physical growth and cognitive development are among the major causes of delayed school enrolment especially in poor rural communities of Africa. Children with low levels of cognitive development are largely characterised by poor school participation, low learning outcomes, high repetition and dropout rates, limited future opportunities and low earning levels (Vegas and Santibanez 2010). The effects of delayed development in early years mostly cause irreversible damage leading to long lasting negative impacts such as intergenerational transmission of poverty (Martinez et al. 2012).

(i) Returns to investment in preschool education

Investment in preschool is reported to have a high benefit-cost ratio; the rates of return from interventions in preschool children is much higher than the rates of return from interventions in older children in primary school. Studies suggest a return of approximately 7-16% annually from investment in high quality preschool programs targeting poor children (Rolnick and Grunewald 2007). Preschools with good quality programs such as complementary health, nutrition, cognitive and non-cognitive stimulation are paramount in preventing delays and at the same time foster early development, particularly for the children living in poverty. This implies investments made towards early intervention are more efficient and are complementary to investments made later on, for example at primary level.

Investments made in period 1 (preschool) affect the learning in period 2 (primary school), but the returns to education are largely experienced in period 3 (post-school). Multi-period analysis can be used to gauge the impact of programs in period 1 and household characteristics on ability before entering school. Ability is assumed to increase in response to household characteristics; and it is mostly assessed in terms of school readiness. Delays in school readiness are reported to have considerable differences in school outcomes over the years of primary and secondary education. The effectiveness of programs in both primary and secondary education in offsetting initial cognitive delayed development can be determined by measuring the impact of programs in period 2, to see if it is higher for more able students. Programs that address the loss of potential that occurs early in childhood may increase returns to schooling which apparently are more beneficial to children living in poverty. The effect of the programs can be properly understood if analysis of preschool children follows them through schooling into adulthood outcomes, however this strategy is limited by lack of data on adult attainment based on their childhood conditions (Alderman 2011).

Variations in the quality of preschool programs are determinant factors on the impact of preschool on live outcomes. Higher quality preschool programs are associated with better cognitive and social development. The

[1] Africa is used interchangeably with Sub Saharan Africa

quality of programs, age of entry, and years of experience in preschool influence reading and mathematics achievement of children aged five and six differently, depending on the children's household income backgrounds (Behrman et al. 2004a). Poor children benefit more from entry at earlier ages and more years in preschool than children from higher income homes, this could probably be due to the fact that the home environment of poor children is not highly supportive for cognitive development and socialization. Barnett (1995) found overwhelming evidence implying that preschool produces a positive impact on school success, better commitment to school, grade retention, better classroom behaviour and being better adjusted socially. Thus, preschool makes a big difference to the lives of poor children: it can mean passing or failing, repetition or progressing to the next grade, dropout or completion of the primary cycle.

Heckman (2006) examined the sources of success in preschool education of disadvantaged children aged three to four, who spent two years in preschool and then joined public school. He did this by following up with adults who fell into this category by estimating the role of enhancement in cognition, externalised behaviour and academic motivation in the lives of the adults under survey. He found that each of these factors affected different outcomes. For instance, cognition affects achievement scores and labour market outcomes; externalizing behaviour affects labour market outcomes, health behaviour and crime; and academic motivation boosts educational outcome and reduces long-term unemployment. Heckman also noted that the preschool curriculum substantially promotes social competency, planning and organisation, and has a beneficial impact on life outcomes. His findings show that preschool programs significantly improve adult outcomes including education, health, employment, earnings, marriage, participation in healthy behaviour and reduced participation in crime.

Berlinski et al. (2009) studied the effect of preschool on primary school performance in Argentina, and found a weak empirical foundation. One year in preschool increased average third grade scores by 8% and positively affected students' self-control behaviour such as attention, effort, class participation and discipline.

Nores and Barnett (2009) analysed 38 contrasts out of 30 interventions in 23 countries on the benefits of early childhood intervention. They compared different types of intervention such as cash transfers, and educational, nutritional or mixed interventions. They examined four outcomes - cognitive gains, behavioural change, health gains and the amount of schooling. They found that interventions with an educational or stimulation component had the largest cognitive effect.

(b) Primary school education in Sub Sahara Africa

Public expenditure on education in Africa is higher at the tertiary level than it is at the primary level, notwithstanding the fact that a large body of literature points to the importance of primary education, particularly in low income countries (Psacharopoulos and Patrinos 2002; Mutangadura and Lamb 2003; Barro and Lee 2010). Brossard and Foko (2007; in Mingat et al. 2010) studied a sample of about 100 countries at different stages of development between 1970 and 2003. They examined the effect of specific levels of education to economic growth and found the effects of primary and secondary education to be statistically

significant. The contribution of tertiary education was positive but not significant. Highly skilled labour depends on productive job opportunities, the size of the structured sector and the productive structure of the country. Their study revealed that growth in low income countries depends basically on primary education and then on lower secondary education.

Primary school enrolment in Africa has increased substantially by 5.5 times from 23 million in 1970 to 129 million in 2008, while preschool enrolment increased 2.6 times from 4.3 million to 10.9 million between1990-2000. The increased enrolment is attributable to the Millennium Development Goals targeting universal primary education for all and the political commitment to abolish school fees in respective countries. However, the increased enrolment rates have not kept up with the rising numbers of out-of-school children which were estimated to be 32 million in 2007 (UNESCO 2011). Furthermore, the growing enrolment rates do not correspond to the rates of primary completion, for example the average completion rate in 2008 was 65%. About 42% of African school children leave school early, with one in six leaving before grade 2. Schools reach out to more children but eventually lose them due to inefficiencies that lead to repetition and dropout (Hanushek and Wobmann 2007).

There is widespread disparity across Africa in terms of the percentages of children who enter the first grade of primary education, and the percentages of those who proceed to the sixth grade. For instance, in Mali 80% of children who enter the first grade, proceed to the sixth grade, while in Ethiopia only 40% of those who enrol in the first grade reach the sixth grade (UNESCO 2011). Primary repetition rates (of students repeating years of school) remain high, particularly in countries like Burundi which has 36%, while Togo, Chad, Congo Republic and Central Africa Republic all have 23% of their primary school students repeating. Generally, children in these countries are more likely to spend two or three years repeating a primary grade. Dropout rates are highest in Chad (72%), Uganda (68%), and Angola (68%), and two-thirds of children starting primary school in these three countries are expected to leave before reaching the last grade. On the other hand, dropout rates are lowest in Mauritius (2%) and Botswana (7%) (UNESCO 2012).

The widespread dropout and repetition rate is partly due to the African governments' failure to extend education opportunities to the region's most marginalized children. Africa has some of the highest inequalities in accessing education, for instance children from the top 20% richest households in Ghana average six years more of education compared to those in the bottom 20% poorest households (Watkins 2013).

(i) Effect of school fees abolition on lower primary grades

Fee abolition led to an increase in the numbers of entrants in the first grade that exceeded the number of students the classes could hold, as well as to very high pupil-teacher ratios. This subsequently led to a decline in learning outcomes in countries where fees were abolished. For instance, in Uganda, the reading ability of pupils in government-aided schools declined by 11%, and the impact was felt more particularly in poorer households where the probability of being able to read a sentence fell by 20%. Malawi is another case in point. Tests indicate that there was poor performance after the abolition of fees in 1994. In 1998, only 19.1% of the

pupils reached the minimum level of literacy competency and only 1.3% reached the desirable level. The results deteriorated further in 2000, when only 8.3% and 0.3% respectively reached the minimum and desirable levels of competency (Chimombo et al. 2005).

SACMEQ evaluated the quality of education in Africa with the help of a simple measure based on literacy - the ability to read fluently and understand a simple sentence. According to the evaluations, 88% of sixth graders are able to read at least at the basic level, ranging from 98% in Swaziland to 56% in Malawi and 52% in Zambia (UNESCO 2011). Deteriorated learning achievement can be attributed to the consequences of enrolment surges such as congested classrooms, insufficient supplies and lack of individual attention from teachers. These findings suggest that fee abolition may have increased the number and rates of enrolment, but at the same time it indirectly contributed to an increase in the number of repeating students and an increase in dropout rates, due to the deterioration in learning outcomes.

(ii) Costs of school failure

Primary education is an important channel to the reduction of poverty particularly for the disadvantaged children. This implies higher enrolment and completion rates are a must, due to the fact that the acquisition of basic knowledge and skills is crucial to poverty reduction. If resources spend on repeating a grade were spent instead on enrolling new entrants into schools, annual GDP growth in countries like Burundi, Madagascar and Malawi would grow potentially by1.3%, 0.7% and 0.6% respectively. Overall it is estimated that each year of real education a child receives without repeating a grade could increase individual earnings by 10% and increase annual growth by 0.37%. Repetition rates of 23% are associated with dropout rates of 30% in Congo, 41% in Togo, 54% in Central African Republic and 72% in Chad (UNESCO 2012).

High repetition rates are also associated with inadequate levels of basic learning achievement in reading and mathematics, and there are cases where children leave school often without being able to read or write. Countries with poor pupil performance such as Lesotho, Malawi, Uganda and Zambia share the same characteristics in terms of repetition and dropout (UNESCO 2012). Repeating a grade increases education costs, increases class size and the cost per graduate. However, repeating a class is likely to enhance the repeaters' learning and labour market productivity.

About one third of the African youth have not completed primary school, they are out of school and lack skills for work and thus require alternative pathways to acquire basic skills in order to participate in the labour market. Lack of basic skills has led to a large percentage of youths being unemployed, or finding employment predominantly in jobs earning wages below the poverty line. The majority of the poor out-of-school children live in rural areas on farms whose average size is approximately two hectares and are confronted with several challenges. UNESCO estimates that every US$1 spent on the education of a person yields US$10 - US$15 in economic growth over the person's working life (UNESCO 2012).

(iii) Benefits of female education

Education gives women the ability to acquire the skills needed for economic power, awareness of their rights and thus the can have enough power to have a voice in decisions that affect their lives, the lives of their

children, and the lives of people in society at large. Schooling largely improves a mother's knowledge and use of health practices, and each additional year of schooling is estimated to lead to a decrease in the U5MR by up to 10% (particularly girls' mortality rate). Monden and Smits (2013) used recent Demographic Health Surveys from 31 African and four Southern Asian countries to gauge the impact of mothers' education on the ratio of male to female child mortality rates. Male: Female (M:F) mortality rates were determined using 49,769 deaths among 521,551 children. M:F mortality rates were estimated on maternal education, while controlling for demographic and household characteristics. The results found that mothers with more education contributed more to a decrease in child mortality rates regardless of a child's sex, than mothers without education. Girls tend to benefit more from an educated mother both in absolute and relative terms (Monden and Smits 2013).

Educated mothers are concerned about the size of their family and thus will opt for family planning and in the process, reduce fertility rates thereby improving the quality of children born to them and the quality of life for both the children and themselves. As a result, female education produces social gains by reducing fertility rates, improving family and child health, increasing life expectancy and increasing the quality and quantity of education and children's attainment. These benefits suggest that even if the ratio of female to male labour force participation rates are low, the effects of improved female education on general levels of education, health status and population growth level can boost economic growth indirectly. In the past, cross-country macroeconomic studies have failed to agree on the effect of gender specific education on growth or on output levels. In large descriptive regressions that did not control for other conventional growth determinants, Schultz (1995) found that female school enrolment had greater impact on economic growth as compared to male school enrolment. Hill and King (1995) introduced an educational gender gap into the cross-section output regression and regressed income per capita on the gender gap, female secondary school enrolment and a set of control variables, and found that female education had a significant positive impact on the level of gross national product (GNP) and associated larger gender disparities in educational attainment with lower levels of GNP.

Contrary to the above findings, Barro and Lee (1994) used average years of schooling data rather than enrolment rates, and seemingly unrelated regression equations and instrumental variables estimation method applied to cross-country data and found a significant negative partial correlation between economic growth and base period female secondary schooling and a significant positive partial correlation between economic growth and male secondary schooling. This negative partial correlation has been reported in other studies by Barro and Sala-i-Martin (1995) and Perotti (1996). This group of studies included life expectancy as a proxy for the health component of human capital, education (which is not disaggregated by gender), was found not to be statistically significant in a range of models that included life expectancy, because life expectancy seemed to be a proxy for the level of human capital and therefore made the level of educational attainment to have no additional explanatory power for growth. However, an additional positive effect on growth emerges when male attainment is high relative to female attainment.

Contradictory results on the impact of gender-specific education on growth can probably be attributed to whether the estimation method involves differentiating the data, whether a short-run or long-run effect of education on growth is being measured which could be influenced by the frequency of the data. Five-year time intervals may be too short to pick up the effect of school enrolment rates on growth, because it takes time before those currently enrolled in secondary school enter the workforce.

2.3.2 Nutrition

According to Townsend (2008) and Black et al. (2008), hunger in Africa kills more children than all the infectious diseases such as HIV/AIDS, malaria and tuberculosis put together. Two thirds of child deaths are related to malnutrition. Malnutrition is the consequence of limited dietary intake, which is caused by household food insecurity, lack of safe drinking water, lack of knowledge on the basics of sanitation, poor health exacerbated by lack of access to health facilities and lack of alternative sources of income.

Why does the present study emphasise the importance of nutrition in factors affecting child poverty? Firstly, because as shown in section 2.1 – children have ranked physical health and bodily integrity and safety such as healthy food among the relevant capabilities. Secondly, because of the crucial role nutrition plays in the success of the rest of the children's capabilities. Thirdly, malnutrition is the number one child killer and also nutrition is crucial to child wellbeing. Finally, the consequences of malnutrition are some of the factors causing intergenerational poverty (from malnourished mother to the foetus) as well as transmission of poverty from childhood to adulthood.

Several studies such as those by Belli et al. (2005) and Victora et al. (2008) have shown that the consequences of malnutrition not only impede children's development in the short term but they also have a negative impact on their cognitive abilities and productivity in adulthood, with substantial economic costs. The critical time range in which to overcome these impediments is from conception through to age two. If a child's nutritional needs are properly addressed in that specified period, the outcome is healthy productive adults. Beyond the age of two, it is feared that the effects of under-nutrition are largely irreversible (Rue and Hoddinott, 2008). This suggests that keeping the problems of early childhood under-nutrition on the development agenda transforms children into healthy adults and gives them the opportunity to participate in the society. It at the same time causes policymakers to maximise the effectiveness of investments designed to achieve overall development goals.

(i) Costs of early childhood under-nutrition

"*The burdens of malnutrition and disease reinforce each other. Malnutrition reduces the body's ability to fight off disease while disease depletes the body of essential nutrients, reduces appetite, and at the same time requires additional nutrients.-------- At societal level, malnutrition leaves children more susceptible to disease and injury, thus placing additional pressure on a country's health care services*" (Apodaca 2008).

Undernourished children tend to have peculiar characteristics such as (a) Low birth weight, which is reported to be a resultant of intrauterine growth retardation (IUGR) and preterm birth or a combination of the two. Preterm low birth weight infants tend to have higher neonatal mortality rates in comparison to full-term

growth-retarded infants. Low birth weight infants who are both preterm and growth-retarded have the highest risk of mortality. In developing countries, maternal undernutrition is known to be the main determinant of IUGR. The prevalence of IUGR births is common among women who are stunted and underweight prior to conceiving or who fail to gain sufficient weight during pregnancy. Poor maternal nutrition during pregnancy is said to account for 14% of IUGR, while maternal stunting may account for 18.5% of IUGR in developing countries. (b) low height-for-age or stunting, (c) wasting –low weight- for height, (d) underweight – the weight is minus 2 standard deviations from the median weight for age of the reference population. (e) micro-nutrient deficiencies of iron, iodine and vitamin A (Fisherman et al. 2000). Rue and Hoddinott (2008) report that in 2005 an estimated 32% of all children in developing countries under the age of five (178 million) were stunted, with the prevalence of stunting being highest in Africa and South Asia. They further reported that 10% of the children under five years of age were affected by wasting.

In addition to the direct impact of malnutrition on cognitive function, it indirectly affects cognitive function through school late entry because firstly, poorly nourished children are more likely to be retarded in motor and cognitive development, leading to them starting their schooling at a late age. Secondly, stunted children act or appear younger than their chronological age, this set of children have a tendency to show slow progress through school and poor academic achievement. Thirdly, malnutrition does not only lead to late entry, but also contributes to higher morbidity rates which reduce social interaction and activity, consequently leading to both high rates of school absenteeism and dropout. And finally, it is reported that adults who were malnourished as children are mostly less physically and intellectually productive, have lower education attainment and are more vulnerable to chronic illness and disability (UNICEF 2009; Bhutta et al. 2008; Black et al. 2008).

Victora et al. (2008) reviewed the association between maternal and child undernutrition with human capital and the risk of adult diseases in low income and middle income countries. They analysed cohort studies data from Brazil, Guatemala, India, the Philippines and South Africa and found that indices of maternal and child undernutrition such as maternal height, birthweight, intrauterine growth restriction and weight, height and body mass index at two years according to the WHO growth standards were closely related to adult outcomes: height, schooling, income or assets, birthweight, body mass index, glucose concentration and blood pressure. The findings of both the reviews of published work and new analyses point to a strong association between undernutrition and shorter adult height, less schooling and reduced economic activity and women were found to have offspring with a lower birthweight. The study concluded that damage suffered in early life is irreversible and will most probably affect future generations subsequently leading to intergenerational poverty.

Alderman et al. (2003) monitored children in Zimbabwe from birth to adolescence and found that those children who were stunted as pre-schoolers lost on average 0.7 grades of schooling and started school seven months later than comparable children who were not stunted. The loss of school years and delay in starting school translates into a 12% reduction in lifetime earnings. Kudzai (2014), examined the impact of poor nutrition on the academic performance of seventh grade learners at two primary schools in Chivi, Zimbambwe.

Data were collected through group discussions, interviews and observations with 12 seventh grade learners, three headmasters and four teachers. The findings indicated that malnutrition negatively affected physical growth, cognitive development and consequently led to poor academic performance, poor health as well as low survival rates of the learners. Malnourished pupils felt too weak to perform any physical work or do sports, and they tended to be absent from school and when at school, had difficulties in concentrating during lessons.

Girls born to undernourished mothers, if they survive, are more likely to remain stunted through childhood to adulthood and largely transmit their malnourished status to the next generation (Black et al. 2013; Harris 2014). This suggests that undernutrition is not only one of the key physical manifestations of poverty, but is also a mechanism by which poverty and its consequences are transmitted inter-generationally. Consequences of childhood undernutrition persist in the face of economic growth and are generally interrelated to nearly all aspects of poverty and development. Haddad et al. (2003) did a multi-country analysis of the causal relationship between income and malnutrition, they used household survey data from 12 countries and aggregate data on a set of 61 developing countries. They modelled the relationship between child underweight and per capita income, proxies by total household consumption per capita in the micro studies and per capita gross domestic product (GDP) estimated using the 1987 purchasing power parity (PPP) rate in cross-country regressions. They then used the model to predict decline in malnutrition from a sustained 2.5% annual increase in per capita income from the 1990s to 2015. They found that in nine of the 12 countries, declines in the malnutrition rate fell short of the Millennium Development Goals target. This led to the conclusion that as much as income growth is important in the reduction of malnutrition, it was not sufficient by itself and thus there was need to apply direct effective nutrition intervention measures that can produce results in the short-run to achieve nutrition goals.

Caulfield et al. (2004) and Fishman et al. (2000) analysed prevalence and risk data to determine if child underweight was a risk factor for mortality due to diarrhoea disease, pneumonia, malaria and measles. Attributable fractions of child mortality associated with child underweight through the above diseases were found to be 44.8% for measles, 57.3% for malaria, 52.3% for pneumonia and 60.7% for diarrhoea. Underweight status among preschool children was found to be statistically significant in contributing to diarrhoea and pneumonia episodes, while the association with malaria turned out to be insignificant. There was no evidence that underweight status influenced susceptibility to measles infection. The fractions of morbidity associated with child underweight were 16.5%, 8.2% and 5.3% for pneumonia, malaria and diarrhoea respectively.

Walker et al. (2000) found height and head circumference in the first 24 months of life to be more significant in predicting IQ at age 11 years than the anthropometric measures taken around the time of cognitive testing, even after controlling for sex, age and socioeconomic factors. These findings suggest that chronic malnutrition at an early age has irreversible effects on intelligence regardless of subsequent improvements in growth. Lack of energy, poor psychomotor function and poor socio interaction may constrain a child from exploring his or

her surroundings as fully as other children, consequently leading to less stimulation and slower acquisition of skills (de Onis 2001). A child that has suffered malnutrition in infancy and continues to live in an environment of scarce resources, overcrowding, poor sanitation, lack of educational opportunities, high morbidity, lack of constructive cognitive stimulation, lack of books and toys is more likely to experience persistent cognitive deficits (Grantham-McGregor 1995).

2.3.3 Water and sanitation

Lack of safe water and sanitation remains among the world's more urgent health issues. Banerjee and Morella (2011) report that only 58% of Africans live within 30 minutes' walk of a clean water outlet and only 36% have a basic toilet. In Africa, approximately 215 million people practice open defecation which contributes substantially to the transmission of diarrheal disease known to be one of the major causes of U5MR (Galan et al. 2013). Ezeh et al. (2014) carried out investigations in Nigeria to determine whether children who are under five years of age without access to improved water and sanitation facilities were at a higher risk of death. Their pooled regression on 2003, 2008 and 2013 data revealed that the risk of child mortality from lack of access to improved water and sanitation facilities was significantly high (38%). Jeuland et al. (2013) estimated the impact of access to improved water, sanitation and hygiene (WASH) on mortality rates and found that a 1% increase in improved water coverage, decreases 0.015-0.025 deaths per 1,000 people per year due to WASH related diseases. The study found that improved sanitation coverage was insignificant in death rates caused by WASH related diseases, the reason probably being due to the high correlation (over 0.8) with water.

Table 2.3 Water, sanitation and hygiene (WASH) related mortality and its economic consequences

	1975 Estimates (Simulated)	2002 Estimates (WHO data)	2008 Estimates (WHO data)	2050 Projections (Simulated)	Total for future (2012- 2050)
WASH-related Mortality rate (deaths/thousand)					
All developing regions	1.3 (0.6-1.3)	0.55	0.41	0.2 (0.08-0.4)	n.a
Sub Saharan Africa	1.9 (1. 6-2.4)	1.6	1.4	0.8 (0.6-1.3)	n.a
WASH related deaths (millions)					
All developing regions	4.1 (2. 0-7.2)	2.9	2.3	1.4 (0.6-3.0)	64 (29- 104)
Sub Saharan Africa	0.6 (0.5-0.8)	1.1	1.1	1.3 (0.6-2.2)	52 (26- 66)
Economic benefits of eliminating WASH related mortality (billions of $US)	(Simulated)	(Simulated)	(Simulated)	(Simulated)	(Simulated)
All developing regions	71(34- 142)	52(47- 176)	42(41- 194)	26(0.0-1,149)	698(283- 10,306)
Sub Saharan Africa	11(8.9- 8.0)	18(18- 28)	19(19- 41)	24(4.4- 251)	519(235- 2,391)

Notes: Aggregated future gains are discounted at 3%, year-specific estimates for 2050 are undiscounted. Base case followed by low and high projections in parentheses. Base case assumes linear associations between coverage and mortality rates and includes the effect of improved water coverage as well as piped water coverage. Source: Jeuland et al. (2013)

Table 2.3 shows that the WASH related mortality rate per 1,000 people depicts a declining trend across all developing regions between 1975 to the projections for 2050. However, when regions are disaggregated, Sub Saharan Africa's declining rate is the lowest as compared to that in South Asia (results not shown) the second-highest region in child mortality rates. The 2050 projections indicate the lowest WASH related mortality in Africa will be 0.6 while the highest will be 1.3 per 1,000 people. Projections for 2050 of the economic benefits of eliminating WASH-related mortality will be experienced more in Africa (US$24 billion), as compared to all the developing countries put together (US$26 billion). The rest of the developing regions are projected to gain less than US$1 billion with the exception of South Asia the projection for which is US$1.5 billion. The

high projection of Africa's potential economic benefits if it invests in water and sanitation is because of its high population growth and high death rates.

Gunther and Fink (2011) estimated the impact of improved water and sanitation access on child mortality rates with the object of evaluating the potential contribution of water and sanitation investment towards the achievement of child mortality target defined by Millennium Development Goal 4. Their estimates indicated that full household coverage with water and sanitation infrastructure would lead to a reduction of 25 deaths per 1,000 children as compared to public water pumps and ventilated pit latrines which reduce child mortality rates by only eight deaths per 1,000. The benefits of full household connection are larger than the investment. Gunther and Fink's (2011) estimations indicate that each year of life saved by water and sewage connection costs less than the economic output per person per year (measured in gross domestic product per capita) for a majority of the developing countries. This implies countries cannot afford to miss out on this investment for it has great economic benefits. Table 2.4 demonstrates cost per life saved as a % of GDP per capita in selected African countries.

Table 2.4 Cost per life-years saved through improved water and sanitation as % of GDP per capita

Benin	0.722	Madagascar	2.164
Burkina Faso	0.380	Malawi	0.827
Cameroon	0.273	Mali	0.528
Chad	0.205	Mozambique	0.359
Congo R.	0.299	Niger	0.675
Gabon	0.150	Nigeria	0.228
Ghana	0.843	Senegal	0.283
Kenya	0.605	Uganda	0.753
Lesotho	0.644	Zambia	0.283

Source: Gunther and Fink (2011)

Gunther et al. (2011), carried out an analysis of the association of water and sanitation with child health indicators across 70 developing countries and 171 household surveys conducted as part of Demographic and Health Surveys. They found that houses with improved quality sanitation had a strong impact on mortality risks at neonatal, postnatal and child levels. Children living in households with high quality toilet facilities had a mortality risk of about 15-23% lower than children living in households without toilet facilities. The effectiveness of good sanitation for reducing child mortality largely depends on the protective care offered by primary or secondary maternal education.

Gunther et al. (2011) noted that the benefits of improved water were generally smaller but appeared quite strong in the risk period between ages one month and one year (weaning period). The findings of Gunther et al. (2011) on the impact of sanitation on child mortality are contrary to those of Jeuland et al. (2013), for the latter found sanitation to be insignificant and water to be significant, while the former reported sanitation to be significant while water was reported to be significant only in cases of children under one year old. These findings suggest that since water and sanitation are highly correlated (0.8), when both variables are added in a regression, one of them takes more significance over the other, depending on the other variables in the equation. The foregoing paragraphs indicate that investment in water and sanitation is a must in the quest to

reduce child mortality rates (child poverty) and realise the potential economic gains that are associated with developed human capital.

The interrelated and multifaceted causes of child poverty point to the fact that even though nutrition is important for mothers and their children, nutrition intervention depends on collective intervention in other sectors such as healthcare, social protection, education, food security, sanitation and water, among other factors. Water Aid (2007) reports that Global Aid on education and health has nearly doubled since the 1990s, while the proportion allocated to water and sanitation has contracted. Bottling et al. (2010) noted that Official Development Aid has made progress in facilitating access to improved water, but access to improved sanitation has stalled, and thus there is need for more aid to be channelled to the sanitation sector.

The desired outcome of lower child mortality and morbidity, and productive human capital requires budget allocations to be spread out. Water and sanitation are relegated to the background, budget allocations should not show preference to particular sectors over others. There is need for integrated approaches, otherwise child poverty reduction will be skewed or slowed, with outcomes that deepen the disadvantages faced particularly by children and women. For example, investment in education alone is not enough, although education is crucial and its benefits are long-term. However, sectors like water, sanitation and shelter need immediate attention in order to control child mortality rates. Besides this, human capability development cannot be parcelled into separate pieces, because if this is done, the quest for child poverty alleviation will ultimately fail. For instance, World Bank (2007) and Sperling (2005) state that although primary school enrolment rates are up, the completion of primary schooling especially for girls, remains a major concern. More than a half of girls enrolled at primary school do not complete primary education. High dropout rates are largely due to inadequate water and sanitation. Girls miss school because they must spend hours fetching water for their families. There is a tendency for girls to absent themselves from school at least one week on monthly basis to avoid the embarrassment of menstruation in schools where toilets are not only unclean but are also shared with the boys in their class (Naeemah et al. 2006). However, the theoretical and empirical literature both attest to the importance of female education in a child's wellbeing.

In countries with high child mortality rate, diarrhoea is the next most deadly child killer disease to malnutrition. It accounts for more deaths in children under five years of age than other causes of death such as pneumonia, malaria and HIV/AIDS combined. Over 90% of diarrhoea deaths are attributed to poor hygiene, sanitation and unsafe drinking water. Among the top ten recipients of aid for water and sanitation in 2005, only one was in Africa, the region that faces great challenges due to poor sanitation and lack of potable water. The criteria for donor financing are not based on countries with low levels of access to water and sanitation. Instead donors' target is guided by factors such as political stability, good governance and good financial management practices (Ginneken et al. 2011). These characteristics are mostly common to relatively rich countries who usually turn out to already have made some progress in the water and sanitation sectors.

Africa is known to have limited resources and would respond more adequately by dealing with severe deprivation of water and sanitation if it received consistent and sufficient external aid for water and sanitation. Due to the limitation of funds, public expenditure on water and sanitation is as low as 0.5% of GDP in some of the African countries. For example, in Malawi, government spending on health and education has grown as a proportion of GDP, whereas the proportion of expenditure on water and sanitation has declined. In 2005/2006, the percentage share of the overall budget allocation to water supply and sanitation was 7.5%, whereas more than ten times that figure was allocated to the education budget and more than 15 times to health (Water Aid 2007).

Ginneken et al. (2011) report that between 2000 and 2008, average public expenditure on water and sanitation in Africa was 0.39% of GDP per capita (US$1.71 per person) in both rural and urban countries and 0.26% (US$1.21per person) in rural-only countries. This spending is below the 1% benchmark suggested by the Human Development Report (2006).

Why is there lack of interest in the sanitation and water sectors? The crisis of water and sanitation is felt most by the poorest group as well as by women and girls who generally have very minimal representation in decision making**.** Due to this, water and sanitation issues fail to feature high on the intervention lists of priority areas in Africa. In addition, observers have pointed out that since water and sanitation happens to fall in the domain of gender issues in Africa, it is a women's issue therefore not much weight has been given to it in terms of important decisions and policies to bring about improvements. Women are known to be the ones who daily spend time walking long distances to fetch water, and in terms of sanitation, they are the ones who engage in home cleaning and looking after children ill from waterborne diseases. Therefore, the impact of poor sanitation and water is felt most by them.

2.3.4 Rural women and child poverty

This sub-section narrates the circumstances confronting rural women that largely contribute to their low status in an attempt to interlink rural women's poor status to child poverty. Smith et al. (2003) defines women's status as "*women's power relative to men*". Women with low status are generally known to have both less access to and control over productive resources (natural, physical, human, social and political capital), tighter time constraints, poorer mental and physical health and lower self-esteem. The linkage between rural women and child poverty has been analysed by describing characteristics peculiar to rural women such as their duties, access to productive resources and their wellbeing.

(a) How does rural women's low status contribute to child poverty?

Women play three significant roles in the lives of children: (i) as mothers (ii) as the main carers of children and (iii) the traditional domestic division of labour leaves the management of poverty as women's responsibility. These roles imply that women's status plays a decisive role in child wellbeing. For instance, poor health and the stress of poverty undermines the maternal capacity to perform an effective parenting role which is crucial to child wellbeing. Women's role as poverty managers faced with inadequate income means

they have to go out of their way to make ends meet. In doing this they resort to personal resources of resilience, resourcefulness and skill in budgeting, in order to provide for their children and in the process, deprive themselves of their own basic needs (Lister 2005).

Generally rural people have agriculture as their main occupation, with a large percentage of them being smallholder farmers who live in regions of low fertility and dependant on uncertain rainfall. A modest percentage of the rural people are wage labourers, displaced people and pastoralists. Across all categories, women tend to be in the majority, because men migrate to the cities in search of work, thus several households are headed by women**.** The landless are among the poorest, and in most cases, these turn out to be women who offer their services as agricultural wage labourers. They depend on selling their labour during seasonal peaks, but opportunities are rare and the rewards are minimal. A number of households have small land holdings on which women are unpaid workers on family plots or occasionally work as non-agricultural wage labourers (Hill 2011; World Bank 2007).

The majority of women on small, independent holdings are farm managers in addition to being unpaid workers on family plots. Rural women are not all necessarily experiencing the same kinds of livelihood encounters. A number of them have autonomy in cases when their husbands have migrated to cities in search of work, as a result they become female family-heads, or when men reside in households where plots and /or crops are divided between sexes. In situations such as these, women do have considerable decision making power and control over the fruits of their labour within their own domain.

(i) Duties of rural women

Rural women are not only mothers, but are also social reproducers as well as economic producers. In sum, they sustain their families and communities (Barrett 1997). In Africa, women produce 60-80% of the continent's food, including both subsistence and market food, on small land holdings and with limited access to production resources, land inclusive. These rural women do 90% of the work to process Africa's food, including tasks such as threshing, drying, winnowing, peeling, grating, sieving and pounding. They do 80% of the work to provide transport and storage of food, and 60% of food marketing (Sofa and Doss 2011).

Besides farm work, a rural woman is expected to perform domestic duties such as cooking, household upkeep, nursing the elderly on a daily basis, as well as taking care of children, maintenance and utilization of fuel resources (Mwaka 1993). It is a woman's exclusive responsibility to supply water, to see to its purification and storage for purposes such as drinking, cooking and for washing household effects and laundry, disposal of waste water and seeing to the maintenance of sanitation standards and facilities. In the process of women's performance of their duties, they supply water, sanitation and food, which are essential in developing child capabilities. Olaniyan and Abiodum (2005) reported poverty incidence to be higher for male headed households at 62.8% compared with 56% for female headed households. However, poverty was reported to be more severe among female headed households.

(ii) Rural women's access to productive resources

Despite the fact that women's decisive role in food production and other forms of productive activities essential to children's needs is evident to all, they still lack equal access to:

Land: A majority of rural women's occupation is agriculture, although they produce 80% of the crops, they own only 1% of the land. Women's access and control over land is crucial in meaningfully empowering them (economically, socially and politically). However, women's attempts to access and gain control over land are held back due to social inequalities associated with customary and traditional tenure systems reinforced by lack of enforcement and implementation of new land laws and policies on gender equality in gaining access and control over land (Naadira 2012). Land reform schemes have displaced systems of land use and tenure where women had certain rights in common law (FAO 1995; World Development Report 2012). The new land titles are usually registered in the name of a male household head, regardless of the women's economic contribution to the household. Most rural women are allocated a small piece of land by their husbands to produce food crops including vegetables which are meant for home consumption and to a lesser extent for sale. The family plot used for cash crops, takes priority leaving women with limited time to work on their plots. Notwithstanding the fact that her labour is required on the cash crop plot, she has no say in the use of the cash proceeds from the sale of cash crops. On the death of her husband in many cases her husband's relatives might fail to honour her ownership rights to the land and could easily evict her.

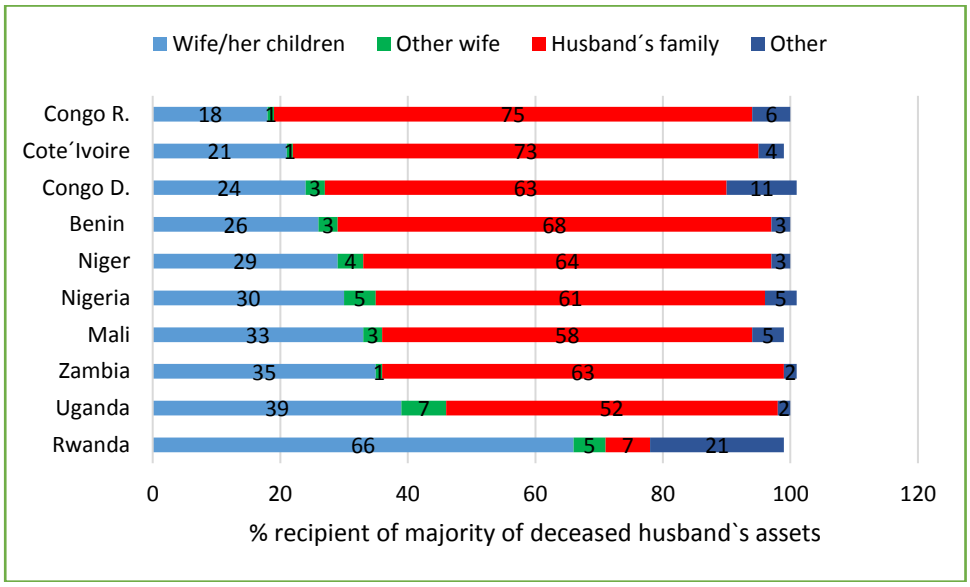

Figure 2.1 The recipients of majority of deceased husband's assets
Source: World Development Report 2012

Figure 2.1 depicts that out of the ten African countries analysed, only Rwanda allows the widow and her children to inherit over 50% of the deceased husband's assets. The rest of the countries' laws and norms allow the husband's family members to inherit over 50%. For instance, in the Congo Republic and Cote d'Ivoire, the figures are 75% and 73%, respectively. These figures portray the difficulties widows and their children encounter under law and norms.

Credit: Women farmers lack collateral (usually land), and have limited scale of enterprises, and thus are disadvantaged in accessing credit and loans. The terms of access to rural loans usually favour more commercial enterprises leaving out important aspects related to food production and household nutrition. Women's low level of education is another obstacle. Besides this, they have less time and money to travel to credit institutions, which mostly are situated in urban centres. Confronted by these challenges, rural women opt to work with informal credit systems such as friends, relatives, informal merchants and money lenders whose interest rates can turn out to be higher in comparison to formal lending institutions (Fletschner and Kenney 2011; Fletschner 2009).

Women farmers receive only 1% of total credit to agriculture and as mentioned, they are also less likely to control the production of their labour than men. This has a negative impact on their incentives in pursuing productive income generating opportunities. Yet the literature demonstrates that the income earned by women is channelled directly to family needs such as food, clothing, health and education (FAO 1995).

Inputs, tools and technology: Access to improved seeds, fertilizers and pesticides is limited due to the fact that extension services fail to cover women and at the same time women are not recipients of government subsidized inputs. Besides that, women tend not to have the cash needed to purchase the subsidized inputs. Lack of appropriate technology has caused production among women to be predominantly labour intensive, with most of the farm work done by family and child labour. High illiteracy levels among rural women is a barrier to accessing the benefits of research and innovation. Women farmers' main domain is food crops which have a low priority in improving research, while at the same time, their roles and needs are often ignored in the creation of the use of new technologies (Mikalitsa 2010).

Extension service and training: Women face constraints such as a lack of mobility, a shortage of qualified female extension staff, inappropriate extension packages and a lack of flexibility in extension services, with timetables that are not always conducive with their day to day chores. Projection in many extension services is oriented towards crops traditionally grown by men, and in some cases cultural factors prohibit women from receiving training (Meinzen-Dick et al. 2014). A study carried out in Nigeria revealed that participating women were faced with problems such as a lack of demonstration equipment and teaching aids, insufficient and ineffective extension services, a lack of training on gender-specific tasks such as processing and storage, a lack of basic infrastructure, inadequate training of extension agents, a lack of appropriate technological and development information, inadequate use of existing women farmers' groups, inadequate coordination between national and international agencies and an urban-biased flow of information (Adekunle 2013).

Poor market infrastructure, information and facilities: Low income women tend to be marginalised by distant and poor market facilities. Insufficient emphasis has been placed on market facilities that attract the participation of women in marketing. Market information remains confined to the literate as well as more

urban-based farmers at the expense of rural women. Information, particularly food security, fails to reach women farmers (IFAD 2011; Asiedu 2012).

Decision making: Social-cultural norms tend to limit rural women's participation in decision making, they have no power and voice to influence decisions that affect their lives. Visseho and Thomas (2014) measured the effects of gender inequality at the individual level by woman's decision making authority at the household level and at the contextual level on the use of antenatal care and skilled birth attendance in rural areas in Kenya, Tanzania, Uganda and Ghana. In Ghana, 46% of women had high decision making authority, compared with 52% in Uganda, 36% in Kenya and 37% in Tanzania. (High decision making was rated based on if women made joint decisions with their husbands, this however depends on if women were active participants or were passive and simply followed what their husbands decided). Visseho and Thomas (2014) found that women with low decision making authority were less likely to use skilled birth attendants at delivery in Ghana and Tanzania, or to use prenatal care in Uganda.

The impact of gender inequality in accessing productive resources can be summed up from the key message of the State of Food and Agriculture (FAO 2011). The report states the need to remove the gender gap in access to productive resources and opportunities such as land, livestock, labour, education, technology, extension and financial services. To do so would enable women to have equal access to productive services as men. The report adds that gender equality will subsequently increase yields on women's farms by 20-30%, and consequently agricultural output in developing countries would increase by 2.5%-4% thereby reducing the number of hungry people in the world by 12-17% (FAO 2011). In addition to this, women and men spend money differently, with women being more likely to spend their income on food compared to men, while men are most likely to spend their income on assets than women are. Normally women spend approximately 23% of their income on food[2], 14% on assets, while men spend 8% of their income on food and 25% on assets (Njuki et al. 2011. Ref. Quisumbing et al. 2014). Asset ownership largely contributes to women's control over income and bargaining power in household decisions.

(iii) Rural women's well-being

Rural women give a high priority to basic needs such as health services, water, sanitation, hygiene, education and infrastructure, lack of access to these basics prevents them from participating in the mainstream of economic development and community life. Lack of power to influence the decisions that would give weight to these basic needs, exacerbates rural women's poor conditions such as poor health, malnourishment, illiteracy and overwork.

Poor health: Access to health services depends not only on availability of services but also on the cost of those services and the ability to pay. Inability to pay affects the wellbeing of women and children. Ahmed et al.

[2] The more women's income increases due to improved access to productive resources, the more they spend on food, subsequently resolving the problem of malnutrition in families. At the same time women's improved decision making power due to increased income and assets enables girl children to go to school which in the long-run reaps the benefits of female education at family, nationwide and worldwide levels.

(2010) analysed the impact of women's economic, education and empowerment status on maternal healthcare use. They found that the odds of having a skilled birth attendant for women in the poorest wealth quintile were 94% lower than that for women in the highest wealth quintile and almost five times higher for women with complete primary education as compared to those with less or no education. Women with primary education were found to be likely to use contraceptives 2.01 times more often and antenatal care visits 2.89 times more often than women with less or no education. Further, women with the highest empowerment scores were between 1.31 to 1.82 times more likely to use modern contraception, attend four or more antenatal care visits and have a skilled birth attendant as compared to those with a null empowerment score. Access to health services will improve health and hence increase economic activity. The health of rural women is affected by several factors such as:

High rates of malnutrition: The high rates are a consequence of inequitable food distribution in the household, "*Men eat first and women eat afterwards, and men eat the best portions*" these are typical cultural practices throughout Africa (Onome and Glory 2011). These practices have a significant effect on nutritional status of women and perpetuate lower standards of health. Other factors are ignorance about nutritional requirements, improper food storage and preparation. Malnourished women tend to give birth to malnourished children (underweight, stunted, absent from school and poor performance) perpetuating the cycle of poverty since malnourished children grow into unproductive adults.

Nube (2005) investigated the relationship between undernutrition prevalence rates in children and adult women in low income and food insecure countries of Africa, Asia and Latin America, at regional, national and subnational levels. At the regional level, all the countries investigated showed a strong and significant positive relationship between undernutrition prevalence rates in children and adult women, the same results were found when regressions were run for countries from Africa and Asia separately. At provincial and district levels, it was found that there were districts and provinces where undernutrition rates were relatively high in both adult women and children, at the same time it was found that in some regions, malnutrition in children was relatively high, but in adult women was relatively low. There was hardly any province or district where women's malnutrition was high but with low child malnutrition.

Economic growth plays an important role in women's nutritional status. Garenne (2011) prepared a report on the trend of nutritional status of adult women in Africa and measured the correlation between average BMI and GDP per capita. The results indicated a correlation but with a weak statistical significance. All wealthier countries with GDP per capita (PPP) greater than US$1500 had BMIs above average (>23.5kg/m²), while countries with a low BMI (<22kg/m²) were among the poorest, with a GDP per capita (PPP) less than US$1,000. A connotation of these findings is that rural women's malnourished status is exacerbated by their low economic status. Malnourished status reduces economic growth directly through the channel of weak work capacity and indirectly through reduced resistance to disease by malnourished bodies, thereby increasing rates of ill health which require caring time and resources for accessing health facilities (Harris 2014).

Water and sanitation: Among the numerous daily chores of rural women is fetching water, which takes an average of one and a half hours in Ghana and one hour in Uganda (Barrett 1997). The time burden of water fetching negatively impacts the time spent on child care and in income generating activities. To gauge the potential benefits of reducing water fetching distance, Pickering and Davis (2012) used data from Demographic and Health Surveys on 26 countries to assess the relationship between household walk time to a water source and child health outcomes. Time spent walking to household's main water source emerged to be a significant determinant of the under-five health. A 15-minute decrease in one way walk time to water source is associated with a 41% reduction in diarrhoea prevalence, improved child nutritional status and 11% relative reduction in U5MR. Bringing water and sanitation services to Africa's women and girls is likely to transform their lives and to boost child survival rates, reduce fertility rates and thereby improve the health of the women and children. It would also liberate women's time from being bedridden, nursing sickly children and from fetching water. Eventually women could engage in productive economic activities that would boost development, reduce poverty and break poverty cycles.

High maternal morbidity and mortality rates: The health of mothers during reproduction is critical to their families, to the communities, and the entire process of economic and social development. Maternal morbidity and mortality rates in Africa are very high, and are highest among the poor, particularly in rural areas where women largely lack access to reproductive and health related services. Over a woman's lifetime, the risk of maternal death in Africa is 1 in 16 compared to 1 in 2,800 in the developed world, and 1 in 46 in South-Central Asia (Meyerhoefer and Sahn 2006).

Why is maternal mortality and morbidity high in Africa? A vicious cycle of poverty is at play. For instance, a poor family has too little food or nutrients, is constantly working despite the low earnings and has little rest or leisure time and lives in an environment that is not conducive to habitation. Low income also becomes an obstacle in accessing medical care, family planning as well as safe water and hygienic sanitation. These problems give way to the wearing and tearing down of the health of the poor and thus rural women easily succumb to maternal morbidity and mortality.

The cycle carries on and in turn, affects production because a sickly mother is not productive and this affects her earnings and condemns her and her off-spring to a life of poverty. And at the same time, she is likely to give birth to underweight weak children who easily become victims of all sorts of illness that result into high child mortality rates. To hedge the risk of the death of children, families opt to having numerous children and this endangers the health of the mothers. In the process of having many children, mothers become depleted and this also affects the quality of children born from depleted mothers. High fertility rates result in low human capability, leading to low production, low income levels and succumbing to high poverty levels and poverty cycles (Rogo et al. 2006).

Maternal morbidity and mortality have adverse effects on household's members. Direct effects are experienced through lower quality care especially for young children, and indirectly this affects young girls because they substitute for sick or low productivity mothers (Meyerhoefer and Sahn 2006). It is evident that at the root cause of these cycles is the inability to pay for basic needs which are supposed to be provided by public agencies. Had the African governments provided for public services, the high percentages of maternal morbidity, child and maternal mortality could have been minimized and thus health shocks, fertility rates and child poverty could have been contained. Governments should invest in child quality and this would raise child survival options and thus reduce fertility rates. This move would improve women's health and could boost their productivity as well as bringing about healthy children who would grow into healthy productive adults and thus counteract economic shocks and eventually break poverty cycles as poverty levels are reduced. Thus, there is need for good institutions to set up good policies which are favourable for the rural poor, especially women and girls, to combat health and economic shocks.

(iv) High illiteracy rates among rural women

Illiteracy is a correlate of poverty and hunger and is mainly a rural phenomenon which hinders rural development and food security. It also threatens productivity and health, and it limits opportunities to improve livelihoods, particularly for rural girls and women. Education is the most effective way to empower the rural poor to get out of poverty. Lack of access to formal education and training is one of the barriers to women's employment and advancement in society. Yet the decision about whether to send girls to school remains with men. Tradition and the politics of poverty more often dictate that sons alone are considered worthy of receiving schooling. These cultural norms are the explanation for the high percentages of illiterate women compared to illiterate men, and cultural norms are directly related to poor health, ignorance about nutritional requirements, and lack of access to credit and land (FAO 2005).

Table 2.5 Percentages of Literacy Rates by Districts in Kenya

	% Literate	% Literate
District	**Male**	**Female**
Machakos	82.3	59.0
Kakamega	80.2	60.7
Kiambu	89.0	28.2
Kisumu	90.5	85.0
Kericho	81.4	61.7
Meru	78.8	63.6

Source: Poverty Report Vol. 1 1997 (Ministry of Planning and National Development, Kenya)

One of the important indicators of women's status in the society is their access to education. Although Table 2.5 shows disparities in literacy rates of men and women in Kenya's districts, it is not representative of the overall picture in Africa, for in most cases women's illiteracy rates are twice as high as men's. The benefits of female education have already been discussed in subsection 2.3.1. Studies carried out by the World Bank (2001) report that the fertility rate of women without education is on average 60% higher than the rate of those who attended secondary school.

McTavish et al. (2010) examined the importance of national female literacy on women's maternal healthcare in Africa 2002-2003, using World Health Survey data. They assessed the effect of association between household income and non-use of maternal healthcare, and found that within countries, a lack of maternal

healthcare use was associated with individual age, education, residence and household income. The results reported that female literacy modified the association between household income and lack of female healthcare, and countries with higher female literacy rates had a weaker association between income and the lack of female healthcare. Female literacy rates reduce income related inequalities through a range of mechanisms such as women's increased labour participation and higher status in society.

The existing literature affirms to the importance of female literacy. However, the success of literacy largely depends on socio-economic and cultural factors. A female literacy graduate will not do much for the wellbeing of her children if all household major decisions are taken without her participation. Neither will literacy improve her economic status if the norms in place do not allow her to work outside her home or if there is gender discrimination in the labour market. Agricultural literacy is hampered if women cannot put it to practice by gaining access to and control land, access to agricultural inputs, technology, information as well as access to credit and market (Puchner 2003).

2.3.5 Quality of institutions and child poverty

The ability of children to be healthy and to be educated (among other capabilities) is determined by economic, social, political and cultural institutions whose individual actions should not act in isolation, but should synchronise to enable the achievement of the multifaceted needs of children. One can say that deprivation of child capabilities directly affects child wellbeing while institutional actions affect child capabilities and therefore affect child poverty indirectly. Thus, there is a need to address institutional actions because they have a determinant impact on the development of child capabilities. In the light of this understanding, institutional actions are analysed through their influence in public expenditure's performance in the provision of public services, governments' commitment to child rights and governments' policies influence on economic growth and distributional outcome on child poverty.

A definition of Institutions - "*It is a set of humanly devised behavioural rules that govern and shape the interaction of human beings, in part by helping them to form expectations of what other people will do"* Rodrik (1999). Another definition of institution is that, *"it is a system of institutional elements that jointly generate a regularity of behaviour by enabling, guiding and motivating it"* (Helpman 2004). This implies that institutional elements are socially constructed and thus institutions can be thought of as systems of rules, beliefs and organizations. North (1990) has defined institutions as "*the rules of the game*" that govern, protect property rights (or fail to do so) and underpin the rule of law. This encompasses informal arrangements to formal laws and regulations. Formal laws are written and enforced by the state; informal rules are typically unwritten and enforced by groups within a society.

The foregoing definitions of institutions in terms of child poverty can be interpreted to imply that institutional actors and agencies have distinct roles, responsibilities and capacities that govern both policies of resource allocation and provision of basic needs and services. In doing what is expected of them, they fulfil their

commitments to child rights which enables children the freedom to access basic needs and thereby develop their capabilities. The success of the crucial roles of institutions depends on their capabilities and capacities.

Institutional quality: Institutional capabilities and capacities are determined by the quality of institutions. This implies that the quality of institutions has a decisive impact on child poverty, and the quality of institutions depends on their foundation. Due to this argument, we take up the discussion on the foundation of the present institutions in Africa. Institutions in Africa were set up depending on the prevailing conditions and these very early institutions shaped the conditions under which subsequent development would occur, thus conditions became indigenous with regard to institutions. Institutions were reproducing the conditions which originally gave rise to them. The initial conditions determined the kind of institutions that were erected, areas which had humid climate and appropriate soil as well as a small native labour force were best for settlement and ended up with plantations operated with imported slaves (Acemoglu et al. 2010). This led to large inequalities in wealth and in political power, and these characteristics in turn fostered the formation of economic and political institutions that favoured the plantations' owners and thus heightening inequality at the same time as hampering economic growth. Such institutions naturally have socioeconomic policies that promote the interests of the rich at the expense of poor families and their children.

Those areas which had a large native population or mineral resources were best for extraction of minerals, and prompted the erection of extractive institutions, without the colonialists settling there. The extractive strategy was adopted in situations in which local conditions were not favourable for settlement. Areas which had a moderate climate, a small native population and were appropriate for intensive agriculture become populated by family farms. In these areas, institutions were replicated from those in Europe with the intention of protecting the property rights of the colonialists while at the same time maximising the rents of European colonialists and not maximising long-run growth (Engerman and Sokoloff 1997; Acemoglu et al. 2002).

The European immigrants established better institutions in areas where they wanted to settle rather than in those areas where they just wanted to exploit. Either way, replicated or extractive institutions once formed, lived (persisted) through independence. Areas that were hospitable to the European settlers ended up with good institutions, and those that were not hospitable were left with bad extractive institutions. The set ups of both extractive and replicate institutions explain why governments whose policies are not child friendly tend to have higher child deprivation indicators than the child friendly governments.

Institutional origin plays an important role in explaining variations in school enrolment and attendance across Africa. For instance, former British colonies tend to have higher enrolment rates than the former French colonies because British colonial educational policies were committed to minimal education for all whereas the French, Belgian and Portuguese educational policies were committed to educating a small elite (Mutangadura and Lamb 2003).

The existence of a colonial regime is refuted as an explanation of national poverty, on the grounds that countries that are former colonies (such as the USA, Canada and Australia) are all much richer than their former colonial master - England. For example, in 1998, England had a per capita GDP of US$18,714, whilst The USA, Canada, and Australia had per capita GDPs of US$27,331, US$20, 559 and US$20,390, respectively (Priest 2009). Africa's institutions are faced with the paucity of paved roads, trucks, power generators, irrigation channels, but Priest argues that a hundred years ago, the developed countries of today did not have these tools. He adds that natural endowments should not be a barrier, because countries like Switzerland, Luxembourg have overcome these obstacles. It should be noted that there are always exceptional cases, and the latter examples may happen to be exceptions.

Institutional capacity: Institutional capacity can affect child poverty through the allocation of resources. Areas at the centre of allocation of resources are provision of public services, public goods and intervention to improve the functioning of markets. A lack of institutional capacity manifests itself through resource misallocation via inefficient investment choices by the public sector. For example, investment in tertiary healthcare and education instead of primary healthcare and education. Differences in institutional quality across countries can be said to be among the most important determinants of differences in child poverty rates across countries. In summary, institutional quality in the present context is a factor affecting the provision of and access to public services, and economic growth reflected in the improved standards of living, which do reduce child poverty.

Institutions affect child poverty through the influence they exert on government policies, which in turn influence growth and distributional outcomes which happen to have a determinant impact on child poverty reduction. Siddique et al. (2016), in their study on the impact of governance and institutions on education and poverty alleviation in the South Asian Association for Regional Cooperation (SAARC) economies, found that governance had a positive impact on poverty and a negative effect on education. Reasons for having contrary effects to those expected is because the lack of good government policies creates an environment rife for increasing poverty levels and reducing education levels.

Public spending is meant to improve human development outcomes, however public spending does not often yield the expected improvement in human development outcomes. Public health spending reduces U5MR more in countries characterized by good governance, and the same case applies to public expenditure on primary education, which tends to produce better results in increasing primary education attainment only in those countries with good governance. The RajKumar and Swoop (2008) study on the links between public spending, governance and outcomes found that public expenditure had no impact on health and education outcomes in countries that were poorly governed.

(a) Public expenditure / investment and child poverty

Under this subsection, the focus is on public expenditure / investment as a factor affecting child poverty. The subsection starts off by analysing human capability development followed by public expenditure and child

wellbeing. The subsection ends by looking into the following question - have the poor children benefited from public spending?

(i) *Human capability development*

Education and health are two of the three most important capabilities (the third being leisure) in a child's life, according to children's views on capabilities. Education and health are both components of human capabilities and contributors to human welfare. The contribution of health and education to economic output is measured by the costs of producing the outcomes such as expenditure on schools and medical facilities (Appleton and Teal 1998). Most of the education and health services are provided by the public sector. Measures of both education and health can be observed through mortality rates, life expectancy at birth (health), literacy rates, enrolment rates, the average number of years of schooling and the level of educational attainment.

Africa has not succeeded in inducing its children to complete school, and a lot of money is spent on educating children who fail to stay in school long enough to learn or acquire any qualifications. Why is there a high proportion of drop outs? Probably it is due to the low quality of schooling offered – no textbooks, writing materials, crowded classrooms, and sub-standard education systems. This implies that public expenditure on education is not evenly distributed across complimentary education sectors such as pre-primary, primary, secondary and university (Ogawa 2004).

Public investment needs to be assessed on a country-by-country basis, according to the structure of the economy of each, and the initial physical public capital stock. The private sector cannot supply public goods and services because they cannot charge a price for their use. These services have to be provided by the government, through its ability to raise revenues from taxation or foreign aid. Higher government expenditure on education, agriculture, housing and amenities like water, sanitation and social security have proved to have statistical significant impact on child poverty (Fan 2008).

What are the factors that determine the impact of public spending on disadvantaged children? To what extent are the social sector expenditures accessed by poor children? Public intervention through promoting labour intensive growth and investment in human capabilities via primary health care, primary education and targeted social sector expenditure can be used to reduce child poverty. Public investment in infrastructure is emphasized as a means of poverty reduction through the channel of facilitating access to markets and the reduction of high transaction costs (Fan and Benin 2009).

Social sector expenditure targets social security, health and education, whereas productive expenditure is on infrastructure and agriculture. Higher growth leads to improved sectoral outcomes in education and health indicators and road access. Improved access to sectoral services and goods leads to greater child poverty reduction (Wilhelm and Fiesta 2005). What factors can affect the level of service provision to children living in poverty? Factors include public non-spending intervention, regulating framework, private sector interventions such as the role of public and private partnership, private provision of services.

(ii) Public expenditure and child wellbeing

Anderson and Hague (2007) carried out a study to examine the hypothesis that increases in public expenditure which translates into benefits for children have a positive impact on economic growth and a negative impact on inequality. About 75 countries that were either low or middle income developing countries were examined with data centred on 1980, 1990 and 2000. Their results found that government expenditure on education had a positive effect on enrolment in pre-primary school, while expenditure on health led to immunisation against measles and diphtheria, pertussis and tetanus (DPT_3), expenditure on housing and community amenities had a positive effect on access to water. Health expenditure also was found to have a positive effect on primary enrolment, while agriculture expenditure had a positive effect on access to water. Child welfare indicators had a positive effect on 'outcome-related' indicators. In particular, immunisation against DPT_3 and measles, and births attended by skilled personnel had a positive impact on child and infant survival rates. A number of child welfare indicators showed positive effects on economic growth, child survival, gross primary and secondary enrolment, primary school completion and births attended by skilled personnel.

Public investment in children is not only a matter of meeting child rights and accelerating human development, but it also turns out to be as productive as investment in agriculture and therefore it is of economic importance. The economic importance is evidenced in the recent studies which report that countries with high child welfare indicators tend to have higher economic growth rates (UNICEF 2012).

There are mixed results on the impact of health expenditure on the U5MR. Some have found the effect to be either small or statistically insignificant. Musgrove (1996) found no indication that spending a larger proportion of GDP at a given income level leads to a lower U5MR for either rich or poor countries. Filmer and Pritchett (1997) report that 95% of cross-country variations in child mortality rates can be explained by a country's per capita income, the distribution of income, the extent of women's education, the level of ethnic fragmentation and the predominant religion. Public expenditure on health had a relatively minimal impact with a coefficient that was numerically small and statistically insignificant. Independent variations in public expenditure on health had less than one-tenth of 1% decrease in U5MR across countries. Filmer et al. (1998), explains that the reasons for poor performance of public expenditure on health vary largely due to the wide disparity in the capability of developing countries to provide effective services. Zakir and Wunnava's (1999) investigations of 117 countries in 1993 on the impact of public health expenditure on infant mortality indicated a minimal role.

Conversely the empirical regressions in some studies report the significant effect of public health expenditure on U5MR. For instance, Anyanwu and Erhijakpor (2007) studied the impact of public health expenditure on the U5MR using data from 47 African countries between1999 and 2004. Their results indicate that a 10% increase in per capita public health expenditure reduces U5MR by 25%. Ssozi and Amlani (2015) examined the effectiveness of health expenditure from 1995 to 2011 in 43 African countries. They found that health expenditure had a significant effect on proximate targets like immunization, malaria, nutrition and HIV/AIDS,

but had low significance on ultimate goals like infant, child mortality and life expectancy. Health expenditure was associated with a decrease in infant mortality by 0.028 and child mortality by 0.048 percentage points. Undernourishment declined from a median of 30.8% (mean = 33%) in 1995 to a median of 26.4% (mean 26.3%) in 2011. Public health expenditure was found to have a more significant effect if it was complemented with good governance and female education.

Issa and Ouattara (2005) employed OLS and panel data on 160 countries to find out the effect of health expenditure on infant mortality rates. They disaggregated health expenditure into public expenditure and private expenditure, countries were divided according to their level of development measured by the income level into low income and high income groups. Their results found that public expenditure had a strong impact on the infant mortality rate in low income countries, while private expenditure had a significant impact on infant mortality rate in high income countries. Gupta et al. (2001) found similar results that public spending on healthcare is more significant on the health status of the poor in low income countries than in high income countries.

African public health expenditure averages 2.5% of GDP, this amount equals a half of the global average of 5.4% of GDP and at the same time is far below the percentage needed to provide basic care. In 2001, spending on healthcare in high income countries exceeded US$2,000 per person per year while in Africa it averaged between US$13 and US$21. The Commission for Macroeconomics and Health urged African governments to increase their expenditure on health to about 12% of their GDP by 2015, this is the minimum amount needed to deliver basic treatment care for communicable disease and early childhood and maternal illness (Anyanwu and Erhijakpor 2007).

A major reason as to why governments under-invest in basic social services is due to the burden of external debt in the national budget (Clements et al. 2005). Two-thirds of countries surveyed reported that they spent more on external debt servicing than on basic social services; some even spend 3 to 5 times more on debt (Annan 2001). How right is servicing high rates of external debt considering that hundreds of millions of children are without access to basic education, primary healthcare, sanitation, safe drinking water and adequate food? It is morally wrong and makes no economic sense because hunger, disease and ignorance are great obstacles to the professed economic growth.

(iii) Have the poor children benefited from public spending?

Household survey data were used by Fan et al. (2005) to investigate the impacts of public investment on growth and poverty in Tanzania. Their results based on the basic needs poverty line found urban areas – Dar es Salaam had only 17.6%, while the rural areas had 40.8% people living under poverty line. These findings indicate that public expenditure favours the urban rich over the rural poor. Despite the fact that governments devote a third of their budgets to health and education, not much is spent on those services that reach the poor. Studies suggest that the top quintile of the population benefit about twice as much on average from public spending on

education and health than the bottom quintile (Castro-Leal et al. 2001). To underscore this point, resource allocation is still biased against primary and secondary education, whereby more resources are allocated to higher education (university) and tertiary healthcare (World Bank 1995). In Burkina Faso, 41% of subsidies benefited the richest quintile while the poorest quintile received only 9% of total subsidies (Wilhelm et al. 2005). More equity calls for greater efficiency in the case of basic social services.

The poor do benefit from expenditure on primary healthcare and primary education, but they benefit much less from spending on secondary education and tertiary healthcare. A large proportion of poor children have limited access to secondary education. This fact exacerbates the plight of families because a survey has revealed that household per capita expenditure in rural areas is highest when the household head has attained secondary education. Infrastructure investment showed that in Zambia, only 20% of the poorest households have access to an improved water source. Benefit incidence analysis indicates that the poor in remote areas have significantly lower access to roads and clean water than those in richer quintiles. In Burkina Faso, the difference is obvious, particularly in the bottom quintile where someone has to walk 2.9km to access the road or clean water source, compared with 0.8km for someone in the top quintile (Wilhelm et al. 2005).

Public expenditure has been limited in most African countries because of poor budgetary procedures and corruption (Delavallade 2006). However, some countries have responded by increasing the transparency of budget management at the central and community levels. High quality public sector institutions can provide better incentives for public services due to enhanced capacity, better incentives for public service providers and more accountability (World Bank 2000). The poor quality of public services hurts poor children, for they have no means to enable them to turn to private services. This also limits their future earning opportunities due to lack of health or skills (under-developed capabilities).

Public expenditure fails to reach poor children if it is biased. Boateng (2014) reports that during apartheid in South Africa, public expenditure was largely disbursed in white schools while black schools were underfunded. Post-apartheid public expenditure has been transformed, and resources are allocated to schools on the basis of their poverty profile (poverty quintile): rates of unemployment, income and illiteracy within the schools' catchment areas. The poorest schools receive the highest subsidy while the richest receive the lowest. Subsequently, significant progress has been made towards a fair distribution of resources. Nevertheless, schools are yet to receive sufficient resources to facilitate an environment of optimal education standards.

Reinikka and Svensson (2004) used panel data from a unique survey of primary schools to assess the extent to which the grant that was established in Uganda by public programs to cover schools' non-wage expenditures reached the end users. They found that between 1991 and 1995 only 13% of the annual capitation grant from the central government reached schools. Schools in better-off communities used their bargaining power to secure greater shares of funding, whereas schools from poor areas which generally have no bargaining power did not receive any funds, for most of the funds were captured by local officials.

The channel by which funds are disbursed to schools plays a crucial role in determining the beneficiaries. Das et al. (2004) surveyed the efficiency and effectiveness of the resource flows to 182 primary (grades 1-7) and basic (grades 1-9) schools in Zambia in 2002. They found that rule-based funds were highly progressive for the same amount was disbursed to all schools regardless of enrolment. This was to the benefit of small schools, which largely tend to have poorer students. Rule-based allocations per pupil translated into more funding for poorer students, whereas of the funds that were channelled to schools at the discretion of provincial and district education officials, only 25% of the small schools received funding.

Increasing the amount of public expenditure in schools by itself does not benefit the children. Al-Samarrai's (2002) cross-country analysis indicated that the link between public expenditure on education and educational outcomes measured by a range of indicators was relatively weak. This finding does not imply that public expenditure is not important. However, what needs to be given attention is prudence (government effectiveness and efficiency) in the composition and allocation of resources based on poverty profiles and focus should be centred on priority areas like learning, teaching materials and other crucial school inputs. The success of the transformations calls for good governance at all hierarchical levels.

(b) Governments' commitment to child rights

The preceding sections have shown that public expenditure has not been spread uniformly to meet the multifaceted needs of children. This subsection analyses governments' commitment to child rights. Governments are enjoined to recognize the right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral and social development (Townsend 2008; Mulinge 2002). To underscore this assertion, a study by Gordon et al. (2003a) grouped the Articles of Declaration into seven categories, resulting in individual indicators, for the purpose of comparison across countries in terms of fulfilment or non-fulfilment of as many as possible of the principle Articles of the Universal Declaration. Within each region, countries were ranked on a continuum standardised by comparative fulfilment of child rights ranging from very much above average, above average, average, below average and very much below average. Africa showed remarkable disparities. Countries which were very much below average from the 47 countries of Africa were Niger, Liberia, Chad, Democratic Republic of Congo, Ethiopia, Guinea, Nigeria, Somalia and Burkina Faso. Of the 47 countries, only seven were noted to be very much above average, this included Seychelles, Mauritius, South Africa, Botswana, Swaziland, Namibia and Cape Verde. These findings reveal that more than 50% of African countries are far from fulfilling their obligations to child rights (Gordon et al. 2003a).

Governments in the past have excused themselves from inadequate action and poor welfare of their children due to the low performance of their economies and lack of resources. But this does not always turn out to be the case. Comparisons carried out by the African Child Policy Forum (ACPF) between the child friendliness index ranking, with the ranking for economic status showed that national commitment to the cause of children is not necessarily related to national income. Countries like Kenya, Malawi, Rwanda and Burkina Faso were among the best performers despite their relatively low GDPs. On the other hand, countries like Nigeria and

Equatorial Guinea, despite having relatively high GDP as compared with the other African countries, have failed to invest sufficient budgetary resources to ensure child wellbeing and as a result have scored poorly in the child friendly index (Bequele 2010; Moszyski 2008). ACPF's findings suggest that the lack of government commitment contributes to child poverty through the failure of child unfriendly governments in ordering their priorities by placing child rights' issues at the centre of their administrative and development policies and programs. What Africa's children need is governments that put children first and the budgets that will provide for them.

(c) Economic growth and child poverty

Monetary measures of child poverty identify poor children (households) by the percentage of the population whose standard of living is below the poverty line. (The monetary approach was discussed in section 2.1). The standard of living associated with living well from children's perspectives is one that gives them the freedom and the ability to develop their capabilities. Multidimensional approaches (discussed in section 2.2) measure each of the capabilities directly, whereas under the standard of living, all the capabilities can be said to be grouped together and are assumed to improve with rising standards of living. The conventional measure of the standard of living is through economic growth. It is assumed in development economics that a rapid and sustained economic growth is required for the improvement of the standard of living which subsequently leads to the reduction of poverty (Dzator and Chen 2015). Economic growth provides governments with the resources to fulfil their obligations to child rights. Besides this, it is assumed that as economies grow, the standard of living of households improves, including the children in the households.

Development is about improving the wellbeing of people through the attainment of goals like higher per capita income, more equitable education and job opportunities, greater gender equality, better health and nutrition, civil and political freedoms and richer cultural life. What contributes to development at the centre of development is economic growth (Thomas et al. 2000). Although economic growth does not produce immediate results to relieve children living in poverty, its long-term results are a must in establishing sustainable economies. Economic growth plays a determinant role in the improvement of both the quality of services and livelihoods (Easterlin and Angelescu 2007), but growth does not automatically translate into improvements in social sectors.

(i) Economic growth and child undernutrition

Vollmer et al. (2012) found that despite the improvements in economic performance in Africa, child undernutrition rates had not been reduced to levels that reflect increasing economic growth. They reported that other explanatory variables such as mother's education, socioeconomic status, and mother's poor nutritional status have more impact on a child's nutritional status than economic growth. Vollmer et al. (2014) analysed data from 121 Demographic and Health Surveys (DHS) of 36 low and middle income countries between1990-2011. Their sample consisted of cross-sectional surveys of children aged 0-35 months, the dependent variables were stunting, underweight and wasting, the main independent variable was GDP per capita in constant prices (PPP). They adjusted models for country fixed effects, survey year fixed effects and socioeconomic covariates of the child, mother and household. Their findings indicate that at the country level, there is no association

between average changes in the prevalence of child undernutrition outcomes and average growth of GDP per capita. The findings were consistent across various subsamples and for alternative variable specifications. There was either a small or a null association between increases in GDP per capita and reductions in early childhood undernutrition particularly of children from the poorest household wealth quintile.

Haddad et al. (2003) used household survey data from 12 countries and data on undernutrition rates since the 1970s from a cross-section of countries. The results from both analyses show that income growth at both household and national levels leads to decreases in undernutrition. The effect is directly through increased household incomes and indirectly through health infrastructure (education, agriculture and infrastructure).

Increases in per capita income growth may not lead to improvements in measures of deprivation, U5MR and child undernutrition because firstly, those suffering deprivation do not automatically partake in the increases in per capita income growth. Secondly, it depends on how the gains are channelled into the economy through investments and redistribution. If the channels fail to target those in the bottom wealth quintile, the poorest may fail to enlarge their entitlements to private health and nutrition inputs. Thirdly, improvements in health and nutritional status will not take place even if the incomes of those in the bottom wealth quintile increased, for the improvement of their wellbeing will largely depend on the right information on how best to utilize the additional resources at their disposal (allocation of resources between food and non-food items, quality of food purchased and the distribution of food within the household). Fourthly, increased national income does not automatically translate into improvements in accessibility to public sector health and nutrition services (vaccinations, prenatal and post-natal care, clean water and sanitation). Improvements in access do not amount to much if the quality of services provided is poor (Smith and Haddad 2002; Vollmer et al. 2014).

Biadgilign et al. (2016) used three rounds of pooled data (2000, 2005 and 2010) from Ethiopian DHS to verify empirically the association between economic growth and a reduction of childhood undernutrition in Ethiopia. Their results indicated that economic growth substantially reduced child undernutrition. The majority of the sampled households were engaged in the agricultural sector, which makes up a significant proportion of the overall GDP. This implies that the improved agricultural productivity in Ethiopia over the decades has significantly contributed to the improved nutritional status. Their findings suggest that the impact of economic growth on child undernourishment depends on the composition of the factors contributing to the rising growth rates. If they are from sectors such as agriculture which happens to be the predominant occupation in rural Africa (as is the case in Ethiopia), then there is a higher probability of associating rising economic growth rate with declining undernutrition.

(ii) Economic growth via agricultural productivity growth and child poverty

There is controversy concerning the links between economic growth and poverty. Some economists maintain that economic growth has a significant negative impact on poverty and inequality, while others argue that economic growth tends to increase inequality and others reaffirm that economic growth is necessary but not a sufficient condition for poverty reduction (Akobeng 2016). Many people question the potency of economic

growth in reducing poverty due to the fact that for the last 40 years, organisations like the World Bank have promoted economic growth in their poverty reduction strategies but have not produced tangible results. Scholars like Constanza et al. (2014), propose alternative national welfare indicators and wellbeing to replace GDP, because GDP is relatively inadequate, mainly due to the fact that it ignores income distribution evidenced by growth or growth strategies' failure to solve income disparity. Certainly, economic growth has shown positive trends in most of Africa, but there have not been the corresponding reductions in poverty that were expected. Contrary to the natural expectations, poverty trends seem to be on the rise, defying economic growth rates. However, there is consensus beyond reasonable doubt that reductions in poverty on average tend to be faster in times and places of fast, prolonged growth, than alongside slow growth, stagnation or decline.

We seek to analyse the issue of the incomes of the poor increasing in proportion with growth thereby improving their standards of living. Increasing income levels has the advantage of enabling families and their children to meet the basic needs which are necessary for the development of children's capabilities. Estimates of the growth elasticity of the general measure for a data set consisting of 144 household surveys from 20 countries over the last quarter century was carried out by Foster and Szekely (2008). They found that the growth elasticity of the bottom quintile was positive, but significantly less than one. This suggests that the incomes of the poor did not grow one-for-one with increases in average income. Their conclusions differed from those of other recent papers that had used per capita income of individuals in the first quintile as an indicator of incomes of the poor, and had also argued that the growth elasticity of the incomes of the poor is equal to one. Foster and Szekely's (2008) results were different from these papers' findings because the former used a different methodology to track the incomes of the poor.

Studies in the past questioned if there was any systematic relationship between economic growth and the share of income of the bottom quintile. These studies concluded that the share tended to decline in the early stages of development, but increased in the long run (Lopez 2004, and Kraay 2004). With the measure of poverty defined in absolute terms, Ravallion and Chen (1997), found that the elasticity of the headcount ratio was higher than 2. This implies that when average income increases by 10%, the proportion of the poor declines by more than 20%. Recent work by Ravallion (2013) shows that the rising economic growth in the developing world since 2000 has reduced poverty and is expected to continue to reduce it if there is no further deterioration in overall inequality. However, the overall inequality that has been relatively stable since the 1990s has recently been showing signs of increasing. This suggests that poverty reduction will continue to be realised only at a much higher economic growth rates in comparison to those seen since 2000. Lower inequality will subsequently reduce poverty and increase growth which in return will continue to reduce poverty.

The idea of defining a threshold that divides the population into poor and non-poor introduces other issues into the analysis. For example, poverty measures become highly sensitive to where the poverty line is set. For instance, in countries where there is a high-income concentration around the poverty line, even infra-marginal

variations in the value of the threshold are likely to lead to large differences in rates. Also, the absolute and relative poverty measures used tend to give exactly the same weight to all the poor. In this way, the increase in income of say the poorest 20% with higher monthly income than the poorest 3% of the population is said to be of the same value. This cannot be the case if the idea is to enable relatively the most gain from growth. Besides that, the idea of being poor loses its meaning if a relative poverty line groups together the lowest 20% of the distribution with of the poorest 3% regardless of their respective absolute poverty and living levels.

Which is the right mix of absolute and relative standards? Most papers that deal with this question have used the data set by Deininger and Squire which includes Gini coefficient and quintile shares for a large number of countries and years. However, Foster and Szekely (2008) have analysed more inclusive micro data, and this has enabled them to apply a weight to each individual in the distribution. In the process, they have used a data set with a high degree of comparability across observations. Their findings concluded that living standards at the bottom of the distribution improve with growth, but that the poor gain proportionately less than the average individual. There are differences between percentiles 10, 20 and 30, indicating that the lower the section of the distribution under observation, the smaller the gains from growth. When greater weight is given to lower incomes (say 10%) the growth elasticity is smaller. Thus, differences in methodology lead to differences in results, not differences in the data set (Bourguignon 2003).

Which kind of economic growth can create equal proportionate gains to reach Africa's poorest? Labour intensive economic growth provides more jobs, thereby enabling the poor to participate and work themselves out of poverty. The majority of those at the bottom are rural and tend to have minimal skills. Most of them are without education and without assets, and the only valuable asset they have is their labour. Agriculture can assimilate the rural poor's characteristics better than any other sector. Diao et al. (2010) analysed the relative importance of agriculture and industry in helping Africa to reduce poverty significantly. The study observed five African countries – Ghana, Kenya, Rwanda, Uganda and Zambia. They found that poverty growth elasticity is consistently larger when growth is driven by agricultural growth than by non-agricultural growth. For instance, a 1% annual increase in Kenya's per capita GDP driven by agricultural growth leads to 1.3% reduction in the country's poverty headcount. However, comparing a similar increase in per capita GDP driven by non-agricultural led scenario leads to only a 0.6% reduction in the poverty rate. A 1% annual increase in Kenya's per capita GDP driven by agricultural growth leads to poverty headcount fall to 17.3% as compared to 21.5% under non- agricultural led growth. These findings are consistent across all the five countries.

Given similar GDP growth rates, poverty growth elasticities are always higher under agricultural-led scenarios. In the majority of African countries, agriculture generates a large share of national GDP and since Africa is largely rural, and the main occupation is agriculture, rural dwellers naturally benefit more from an agricultural-led growth than from a non-agricultural-led growth, thus it can be said that agricultural led growth is more pro-poor than industrial led growth, since it allows for greater participation of the poor in the growth process (Thurlow and Wobst 2006; Diao et al. 2010 ;Valdes and Foster 2010). Christiaensen et al. (2011) took an

empirical perspective to determine the contribution of each sector to poverty reduction. This was based on the sector's direct impact on growth in other sectors, the extent to which poor people participate in the sector and the size of the sector in the overall economy. Based on these criteria, cross-country results revealed that the agricultural sector is more effective in reducing poverty among the poorest at the bottom of wealth quintile. It is up to 3.2 times better at reducing US$1 a day headcount poverty in low income and resource rich countries. They noted that when it comes to the better off poor (US$2 a day), the non-agricultural growth sector has a slight advantage over the agricultural growth sector. Precedent research reveals that economic growth, channelled particularly through the agricultural sector has a significant positive impact on lifting the poorest from the bottom quintile. Akobeng (2016) investigated the effect of GDP per capita growth and sectoral growth on poverty, and examined whether the growth poverty link can be strengthened by institutions. With the help of a panel dataset from 41 African countries over the period 1981-2010, he found that GDP per capita was important in poverty reduction, and that the agriculture sector had direct poverty reducing effects. The findings further indicated that good governance (accountability, competent bureaucracy and sound policies) was important in sustaining growth and reducing poverty in Africa.

Chong and Calderon (2000) empirical results on the link between the measures of institutional development and poverty during the period 1960-1990 show that more efficient institutions lower the degree, severity and incidence of poverty. Tebaldi and Mohan (2010), applied eight alternative measures of institution to determine the impact of institutions on poverty. They found that an economy with political stability, government effectiveness and controlled corruption creates an enabling environment to promote economic growth, minimise inequality in income distribution and reduce poverty. An economy with the opposite of these institutional qualities negatively affects income levels through market inefficiencies and at the same time escalates poverty incidence via increased income inequality. Tebaldi and Mohan (2010) found that voice and accountability, rule of law and quality of regulatory system affect poverty through the channel of average income instead of income distribution.

Which is the direction of causality between institutions and economic growth in poverty reduction? Some schools of thought argue that higher incomes lead to demands for better institutional quality. Better institutional quality is likely to be blocked by the influence of the established elite (State capture) who reap private benefits from a status quo of mis-governance, through channels like corruption. This group of elites can resist demands for change even as income rises over long periods of time. The price commodity boom of the 1970s never led to better institutions in Africa; only countries with fully-fledged democracy behind good governance like Botswana and Mauritius reaped the fruits of the boom of the 1970s (Ingutia 2007).

The direction of causality between the quality of institutions and economic growth in reducing child poverty can be said to mostly depend on the child deprivation indicators being examined. Hallerod et al. (2013) analysed the relationships between democratization and quality of government and specific forms of severe child deprivation (safe water, food, sanitation, shelter, education, healthcare and information) in 68 low- and

middle-income countries. The results show that government efficiency had an impact on lack of safe water, malnutrition, lack of access to healthcare and lack of access to information. They found that the impact GDP per capita was more consistent than the impact of quality of government on sanitation, shelter and education. They added that the reasons why poor governance would have more adverse effects on safe water, health and information than on food and shelter could probably be because the investment, production and distribution of the former requires high level technical and administrative competence by the public administration. Also, there is a tendency for most of the rural population to build their own dwellings and grow their own food without help from the state. Generally, provision of education and health largely depends on political initiative and a functioning of public administration (quality of government) and yet their results indicate that education is more dependent on GDP per capita.

Uslaner and Rothstein (2012) used path dependence across almost a century and a half to present theoretical arguments for a causal link between universal education and the control of corruption. They indicate a link between education levels in 1870 and corruption levels in 2010 for 78 countries. This link remains strong even after controlling for change in the level of education, gross national product per capita and democratic governance. They found that in both colonies and the West, the provision of education by the state in a more egalitarian way has led to long-term benefits for good governance. As the egalitarian societies educated more of their citizens, this subsequently gave their citizens opportunities and power thereby reducing corruption.

2.4 Conclusion of the literature review of factors affecting child poverty

Children's needs are multifaceted and therefore require multidimensional measures. Children living in poverty being the best consultants to give first-hand information, their perspectives have led to the formation of 'Child's perspectives deprivation approach' in measuring child poverty in addition to the other deprivation approach measures. The capacity and capability of institutions is largely determined by their foundation. Poverty reduction has not responded proportionately to growth increases. Sensitivity of poverty reduction to growth has been low in Africa partly due to factors like higher than average inequality, the quality and the kind of growth and institutional quality. Although public expenditure on child poverty is insufficient, it was reported to have a positive effect on child-welfare indicators like infant and child survival, education, DPT_3 immunization, and access to water and sanitation.

Several studies in the literature review have attested to the fact that the early years of life are crucial in the development of mental and physical health which eventually enables adults to reach their full potential. Delayed development substantially leads to irreversible damage, thus there is need to shift the focus from higher investments in primary education to investments in preschool education. Getting disadvantaged children enrolled directly into primary schools without attending preschool leads to enormous economic and social losses such as high repetition and dropout rates, with losses of resources, revenues and individual earnings culminating into higher poverty levels. Notwithstanding the fact that women contribute a large percentage of Africa's agricultural economy, they still face constraints in access to productive assets including land and

complementary factors of production like credit, fertilizer and education. Besides women's prominence in agriculture, they also bear the brunt of domestic chores, such as processing food crops, fetching water and firewood, and nursing and caring for the elderly and sick. The numerous causes of child poverty are largely interdependent and mostly emanate from the institutional setup which apparently has a profound influence on the causes. Institutions depend on economic growth as a source of sufficient revenue to execute budget allocations which enable public expenditure to be directed towards priority sectors that enhance child wellbeing. As is evident from the literature review, increasing economic growth does not automatically translate into child poverty reduction. Poor people can only benefit from economic growth if institutions frame pro-poor growth policies which in the process reduce inequality levels. Alongside economic growth, government strategies should turn to social protection programs directed to areas which have a positive impact on children's capabilities.

The well-functioning of institutions depends on institutional capacity and capability to execute good policies which are a product of qualified and competent human resources. The supply of good human resources is largely influenced by access to education and the quality of education. The access to education depends on household income, which in this case depends on women's access to productive resources which is determined by the prevailing social-cultural norms. Access to good quality education is mostly dependant on public expenditure per pupil as a percentage of GDP per capita. Women's access to productive resources improves their wellbeing, which in the process enables them to give birth to healthy children who go to preschool at the appropriate age in order to advance their cognitive development, which will empower them to reach their full potential and thereby end the intergenerational vicious cycle of child poverty within a single generation.

Does lack of access to education cause child poverty or does child poverty cause lack of access to education? To what extent can the low status of rural women be considered to be a contributing factor to child poverty? The objective of the literature review (Chapter 2) is to provide the framework for answering the above research questions. This chapter has connected our ideas to the ideas emanating from the previous studies in child poverty. The Bristol study analysed child poverty by measuring child deprivation indicators such as education, health, food, information, safe drinking water, sanitation and shelter. The Young lives project investigated the changing nature of the causes and consequences of child poverty over time. It used similar variables to those used in the Bristol study but added childcare, child work, childrearing, and social capital. We have gathered information from other precedent studies on education and child poverty, nutrition, water and sanitation, rural women and child poverty, and quality of institutions and child poverty. The conceptual framework in the succeeding chapter is an outcome of the work of the precedent studies in conjunction with the research objective – to analyse factors affecting child poverty. So far it can be summed up that rural women's limited access to resources affects child poverty more than children's lack of access to education, which appears on the scene much later, after the harm has already been done to the children through their mothers' poor health and low status.

3. CONCEPTUAL FRAMEWORK

"Education - especially basic primary and lower secondary education helps to reduce poverty by increasing the productivity of the poor, by reducing fertility and improving health and by equipping people with skills they need to participate fully in the economy and society" (World Bank 1995).

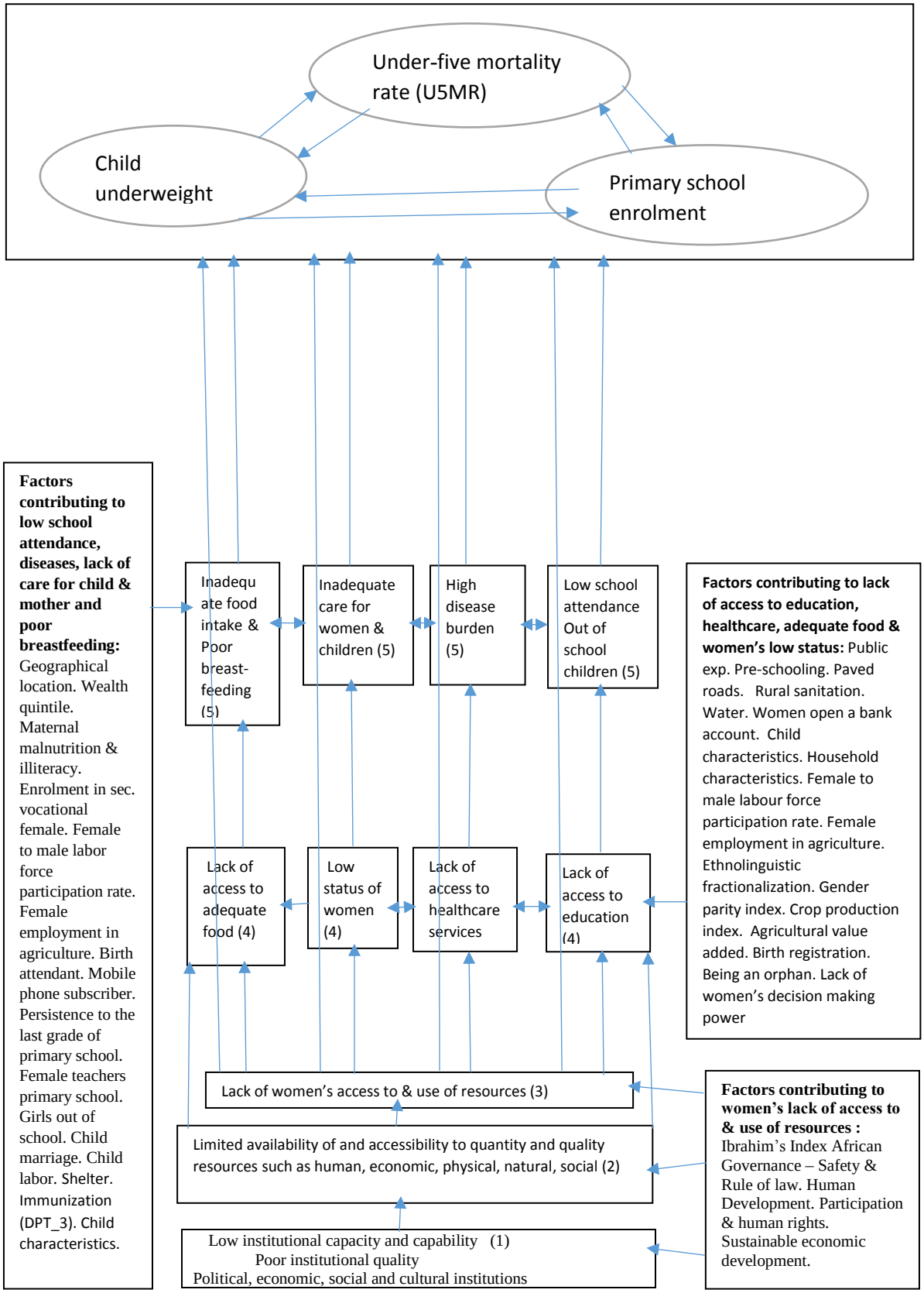

Figure 3.1 Conceptual framework for analysing factors affecting child poverty Adapted from UNICEF (1998), IFPRI (2003), Engle et al. (1999), Black et al. (2008) & Black et al. (2013) and expanded for this study's purpose.

The objective of Chapter 3 is to draw key variables from the literature review in Chapter 2, explain all the possible variables related to each key variable and then explain the inter-relationship between the key variables. Figure 3.1 points to possible attempts to conceptualise of the factors affecting child poverty. The key variables are (1) under-five mortality rate (child poverty) which stands for the quality of children's lives understood in relation to child wellbeing measures like child education status – (2) primary school enrolment and (3) child health status – child underweight (Sen 1999, Wendy 2015 and Statham and Chase 2010). A child's poor education status is observable through low school attendance and the out-of-school children in cluster 5. Reasons for poor education could be high disease burden, inadequate care and food intake in cluster 5, or lack of access to school, healthcare services and adequate food; and women's low status in cluster 4. Reasons contributing to children's lack of access to the basic services in the fourth cluster are largely indirect as it comes about because of women's lack of access to and use of resources in the third cluster and limited availability of and accessibility to adequate quantities of good-quality resources in the second cluster. The direct effect is determined by the availability of and accessibility to human, physical, natural, financial and social assets (2) which affect a child's education directly as indicated by the arrows from cluster 2 to cluster 4. The factors in cluster 2 are determined by the actions and policies of political, economic, social-cultural institutions in cluster1.

A child's poor health status is visible through other causes of poor health such as high disease burden, inadequate care of women and children; and inadequate food intake and poor breastfeeding practices in cluster 5. These causes of poor health are an outcome of lack of access to healthcare services, the low status of women and the lack of access to adequate food in cluster 4. The factors in the fourth cluster are partly an outcome of women's lack of access to and use of resources in the third cluster. Poor institutional quality leads to low institutional capacity and capability which manifests itself through limited availability of and accessibility to resources in subset 2, which indirectly affect a child's health status through women's lack of access to and use of resources (3) and directly through the effect of cluster 2 on cluster 4.

Women's low status (4) and inadequate caregiving practices for both mother and child (5) affect both child's health and education status. And the former is mostly dependant on women's decision making power, because mothers are the main caregivers of children and it is important for them to participate in decisions concerning household purchases, healthcare services and in children's education. Their power to make decisions usually depends on their economic power in terms of income and asset ownership (3) and this is determined by institutional policies and actions (1) and (2). Institutions are supposed to supply schools, healthcare and infrastructure such as roads, failure to provide these services can lead to lack of access to resources which depend on their allocation. Allocation of resources depends on institutional policies at the economic, political and social-cultural levels.

3.1 Child poverty and child health[3]

The health status of the mother impacts the health of the child prior to, during and after birth. Half of all infant deaths occur in the first month of life, with a tendency for two thirds of these to occur in the first week. Maternal-foetal transfer of essential nutrients could be a possible influence on these outcomes (Christianen 2003; McGregor et al. 2007). A study by Olalekan (2008) reported that in Nigeria, low birth weight children were 37 times more likely to die during infancy compared to those born with normal weight.

3.1.1 Child underweight

We use child underweight as an anthropometric indicator which is an index of weight-for-age that reflects both the long-term (stunting) and the short-term (wasting) nutritional status of children to assess the health and nutritional status of children. This indicator is useful in providing the best general proxy measure for child welfare, reflecting dietary inadequacies, infectious diseases and other environmental health risks (WHO 2010). Underweight children are generally weak and susceptible to diseases, impacting negatively on school enrolment, grade attainment, school attendance, learning efficiency per day spent at school, leading to poor learning outcomes which eventually contribute to limited livelihood earning and opportunities (Harttgen et al. 2013).

Child underweight is associated with household income, mother's education and geographical location. WHO (2010) and McGregor et al. (2007) report that children in the poorest households are twice as likely to be underweight as those in the least poor households. Children whose mothers have no primary education are more likely to be underweight than those whose mothers have primary education (Yakoob et al. 2011). Children from rural areas where social-cultural practices are deeply entrenched are more likely to be underweight than those from urban areas with minimal regard for social-cultural norms. Factors affecting child underweight in this study are women's status (gender parity index), women's nutritional status (BMI), having a skilled birth attendant, low birth weight, breastfeeding, female enrolment in secondary vocational education, married women being able to open a bank account, ethnolinguistic fractionalization, DPT_3 immunization, child marriage, U5MR (child poverty), primary school enrolment, out- of-school children, crop production index, mobile phone subscribers (information), wood fuel (shelter), wealth quintile, geographical location and institutional quality.

Women's status: In the present study, women's status connotes women's power relative to men at household, community and national levels. It is power that gives the ability to make choices, and to define goals and pursue them. Power is exercised through decision making and can be either actual decisions taken as an individual or taken jointly with another person through the process of bargaining and negotiation. Power can also take the form of deception and manipulation, subversion and resistance, violence and coercion or non-decision making which a person or group accepts the status quo and thereby allow others to make decisions for them (Sen 1990). Woman's access and control over resources, including human, economic, physical, natural and social resources, enhances her ability to exercise choice. Examples of economic resources are

[3] Child's health status develops right from the utero or soon after birth (McGregor et al. 2007).

income, time, productive inputs, financial assets and food. Human resources are education, skills and knowledge, while social resources are social networks such as membership of groups and access to kin. Natural resources are land, water, trees and soil fertility. Physical resources are agricultural and business equipment, houses, consumer durables, transportation, water supply and sanitation facilities. Political resources are citizenship and effective participation in governance (Meinzen-Dick et al. 2014).

Women's status defined as women's power relative to men thus addresses the inequalities in the ability of women and men to make choices, which may be reflected in inequality in access and control over the resources (Smith et al. 2003). Social cultural institutions have deeply ingrained customs and norms based on beliefs, values and attitudes, which normally dictate differential roles, rights and privileges for women and men. These social-cultural values cause women and men to face different incentives or obstacles in the job market (work place), access to education, and other services particularly those that serve female specific needs, as well as access and control of productive inputs such as land and credit. Socio-cultural norms determine who has a say in decision making (bargaining and negotiation).

We use the ratio of girls' to boys' enrolment in primary school (gender parity index) as a proxy to measure women's status. Socio-cultural practices such as biases in favour of boys, child marriage, and domestic duties all contribute to the limitation of girls' participation in primary education. The importance of female education in child wellbeing has already been discussed in Chapter 2. Women's status play a determinant role in the kind of care women and children receive.

Care, women's status and child health: Smith et al. (2003) defines care as "*the provision in households and communities of time, attention, and support to meet the physical, mental, and social needs of the growing child and other household members"*. The kind of care a mother and her child receives depends on her status in terms of her ability to decide to make use of health facilities like skilled antenatal care and birth attendants. Access to skilled birth attendants is largely determined by women's status, for example in some households all decisions are made by the household head which in most cases is a man. Some men may not see the need of using the services of a skilled birth attendant, probably because in the past women either delivered by themselves or at most were assisted by traditional birth attendants. However, in families where women can make decisions jointly with their husbands, the probability of using the services of skilled birth attendants is higher.

Children's wellbeing such as health and education status largely depends on the kind of care they receive. The quality of their wellbeing starts right from the foetal stage, and this stage largely depends on the mother's health and the kind of prenatal care she receives, the birthing care as well as the neonatal care for both the baby and the mother. Prenatal care practices entail preventive interventions such as immunization against tetanus toxoid, prevention and treatment of issues such as anaemia and infections, and detection of high risk pregnancies that require special delivery care. During prenatal visits, women may receive instructions on good hygiene, feeding and caring practices both for themselves and their babies. Birthing care such as delivery in a

medical facility with skilled birth attendants backed up with emergency obstetric care largely reduces the health risks for both the mother and the baby and minimises the numbers of maternal and neonatal mortality rates in Sub Saharan Africa.

We use *BMI (Body Mass Index)* to analyse women's nutritional status. Maternal nutrition is intimately intertwined with infant health and survival. A malnourished mother has inadequate nutrients to be transferred to the baby, and consequently these deficiencies translate into a low birth weight infant who faces a higher risk of growing into an underweight child. According to the medical literature, (Saunders and Smith (2010); Huffman and Dominic (2011); Save the Children 2012), the effects of malnutrition in the first two years of a child's life are irreversible.

A mother's health and nutritional status is crucial to her child's wellbeing because the nutritional status of a child and the amount of care given to a child are generally dependant on having a mother. The mother ought to have the right knowledge on food preparation and storage, how frequently to feed their children, hygiene and home health practices as well as showing their children affection. Knowledgeable mothers try to make sure that their children do not get sick, because when children get sick, they lose their appetite and lose weight from causes such as diarrhoea or pneumonia. Thus, constant care given to children can ensure their survival, growth and development. In most of Africa, the traditional division of chores between men and women has led to men not having the skills required to ensure the appropriate nutrition and care for the children.

Crop production index and breastfeeding: Crop production is used to gauge availability of food. Poor annual crop production may lead to food shortages implying more demand than supply resulting in high prices, thereby making food economically inaccessible to poorer households. This consequently makes poor families experience inadequate food intake, and the impact is felt more by lactating mothers who may end up not having enough milk to breastfeed their infants (malnourished mothers and their children). Poor crop production may partly be attributed to women's lack of access to land, credit, agricultural inputs and agricultural extension programs.

Primary school enrolment and female enrolment in secondary vocational education: Although child underweight negatively impacts school enrolment, school attendance and school performance, conversely school enrolment with feeding programs, particularly preschool enrolment has a negative impact on child malnutrition. For instance, pre-schools with good quality programs like complementary health, nutrition, cognitive and non-cognitive stimulation may contribute to the improvement of the nutritional status and cognitive development of children living in poverty by preventing delays, and at the same time foster early development. Female enrolment in secondary vocational education is used to measure the impact of a woman's education on child underweight. Mothers as the main caregivers of children need to have the right education to equip them with the right knowledge and information. Primary education is sufficient for giving the knowledge on how to take care of children as regards hygiene, the right feeding practices, and providing the right information about immunization for children (Mellington and Cameron 1999). We use female secondary

vocational education because firstly, education delays marriage and there is a common tendency that the age at first birth is relatively higher for women who have a higher level of educational attainment and as a result, this normally reduces high rates of child underweight, high child and maternal mortality rates. Secondly, graduates from vocational schools have a job market advantage over those from say, primary school, since they have already been trained to have specific job skills. Finally, women with secondary education are in a better position to bargain and negotiate in decision making in circumstances where cultural norms allow them to participate in decision making[4]. Formal education imparts health and nutritional knowledge to future mothers, thus female education is negatively correlated to child underweight. Providing all girls with at least primary education today would pay off in the long-run by raising demand for education among future generations of children. Educating girls has a higher social return than educating boys because educating girls is associated with reduced child mortality, decreased fertility, and increased education achievement of their own children (Karen and Bharadwaj 2015). Female enrolment in secondary vocational education is positively correlated with DPT_3 immunization, agricultural value added, the gender parity index, birth registration and female access to credit and is negatively correlated with out-of-school children, child marriage and child underweight.

Child marriage and under five mortality rate: Child marriages are largely due to cultural beliefs and practices, compounded by families' poor economic status. Empirical studies have shown that child marriages contribute to a high percentage of maternal and child morbidity and mortality rates (Malhotra et al. 2011). Teenage mothers generally have no formal education, live in poverty, have no access to prenatal and antenatal care, mostly give birth to low birth weight babies, who grow up (if they do at all) suffering from malnutrition and a host of diseases such as diarrhoea. Child marriages deny a child the right to be educated, thereby limiting her development and life chances. A majority of child brides are most likely to be out-of-school children and orphans. Child marriage is negatively correlated with factors that boost education – primary school enrolment, female teachers in primary school, agricultural value added and positively correlated with factors that increase child underweight including out-of-school children, poor shelter and low gender parity index.

Women's access to information via mobile phones: The mobile phone has become an effective device for texting input and output price information to farmers. This mode of information increases the earnings of the farmers because the middlemen's role in input and output price information is done away with and thereby the commission gains that once accrued to the middle-man are now added to the revenue gains of respective farmers. The efforts of the Tanzanian government to improve maternal and new-born health urges pregnant women to sign up to receive mobile phone text messages on staying healthy during pregnancy and after giving birth, it also reminds them of doctor's appointments. Thus, the mobile phone has become a powerful tool for

[4] With decision making power, they may not face time constraints and thereby have social capital to network and join associations such as those formed based on ethnicity with the objective of pooling their resources together and lend to group members as per their agreement. And with time might be empowered to open a bank account broadening their opportunities to access credit.

reaching the remotest population in Tanzania, but with the exception of illiterate women who cannot read text messages.

DPT_3 (immunization): "*Immunization remains the single most feasible and cost effective way of ensuring that all children enjoy their rights to survival and good health*" (UNICEF 2000). Children receive DPT_3 vaccination series to immunize them against diphtheria, pertussis and tetanus. In order to be fully protected, children must receive three doses of the vaccine, administered at the age of one month, one and a half months and three months. Complete coverage with DPT_3 is a particularly valuable indicator of countries' performance of routine immunization and is often considered to be among the best indicators of children's access to basic services, including health services (UNICEF 1999). Based on this understanding, we therefore use DPT_3 to measure children's access to healthcare facility. Maternal education is associated with completed DPT_3 vaccination series, and lack of completing the series implies that children are not protected from diseases which they are supposed to be immunized against. DPT_3 is positively correlated with birth registration, because the latter grants children civil rights to access health and other basic services.

Ibrahim's Index African Governance (IIAG): Children suffer from multiple deprivations due to the fact that basic services are not made available to them. The availability of these services is determined mostly by a combination of political, economic and social-cultural factors (Pupavac 2011; Witter and Bukokhe 2004). Governments which are signatories of the UN Convention on the Rights of the Child (CRC) and human rights agreements are expected to bear the responsibility for the progressive realisation of child rights through respective government ministries. The multidimensional nature of child poverty goes beyond economic institutions and requires the inclusion of political and social-cultural institutions, which are expected to be well-coordinated in order to produce positive outcomes. IIAG defines governance "*as the provision of the political, social and economic goods that a citizen has the right to expect from his or her state, and that a state has the responsibility to deliver to its citizens" (*Mo Ibrahim Foundation 2016). We use IIAG to measure the impact of governance on child poverty because its definition of governance is in line with the present study's objectives. Good quality governance is assumed to be negatively correlated with child underweight.

Household's wealth quintile: This is a determinant factor in accessing basic services, although in theory most of the services are meant to be free of charge, in practice in most of Africa there are other costs to incur before making use of these services. These costs are a barrier to families, particularly those from the bottom quintile who are not in a position to make use of publicly provided services such as primary education (parents' contribution to maintenance of school inputs) and primary healthcare (user fee). Children from the lowest wealth quintile tend to suffer more from malnutrition than those from higher wealth quintiles because their families cannot afford to access adequate nutritious food.

Shelter and wood fuel: Besides education which comes later on in a child's life, the environment in which a child lives has a determinant role in a child's health. The majority of poor families' shelter can be characterised as being temporary structures, overcrowding, unhygienic garbage disposal, lack of adequate water drainage and unsafe drinking water and sanitation. Indoor air pollution is largely caused by solid fuels (wood, animal

dung, crop residues coal) burned in open fires and simple stoves with poor ventilation, generating high levels of smoke exposure particularly to children and women. This apparently contributes to the risk of low birth weight, stillbirth, pulmonary diseases and acute respiratory infections in childhood impairing a child's health and thereby interferes with a child's food intake and ingestion which may increase child's poor nutritional status (WHO 2005). The characteristics of poor shelter point to the multifaceted deprivations experienced by poor children thereby exposing them to high risks of morbidity and mortality, lower levels of education (Lack of a comfortable quite space at home which can cause children to have difficulties in studying and thereby affect their performance at school) or none at all and diminished economic opportunities.

3.2 Child poverty and child education

Education develops both life and livelihood skills and offers more opportunities; it has the potential to transform a society in a single generation. The primary potential benefits of schooling are associated with improvements in the child's future socioeconomic status, it enhances the opportunity to obtain better jobs, improves children's productivity and earning prospects, it facilitates their access to wellbeing facilities such as having an adequate quantity of nutritious food, good healthcare, good shelter, freedom of speech and information (Schaffner 2004).

3.2.1 Primary school enrolment

The education level of an earning household member is an important factor in poverty risk of the family, this is due to the fact that education affects a person's earning positively. Education and skills promote labour productivity and consequently labour productivity positively influences the productivity of other factors of production. Having a low level of education is one of the key factors keeping people poor over the decades or over life cycles. Education is essential for the exercise of all other child rights. It promotes a child's individual freedom and empowerment and also yields important development benefits (Bellitto 2015).

Education through the channel of information enlightens children on the awareness of their rights and thus demand for them. This constrains institutions, especially those of democratic setting, to implement favourable policies on child rights. In this way, as children receive education, the other capabilities will fall in line. Therefore, education can be said to be a powerful tool which economically and socially marginalized children can use to lift themselves out of poverty when they become adults and it empowers them to participate fully in the society (Bok and Simmons 2004). The capability of freedom is more likely to be realised in a society of literate than that of illiterate populace (Harber 2002). Primary education leads to exposure, people become more receptive to modern medical care and treatment, at the same time creates awareness of prevention from epidemics. Information media such as use of radio, television, internet and newspapers increases with educational attainment. Media spreads information on health threats, public programs and availability or lack of social services. Income boosting indicators like agricultural value added and public expenditure are positively correlated with primary school enrolment. While U5MR, child underweight, child marriage and child labour are negatively correlated with primary school enrolment.

Preschool enrolment: It is an essential development that lays the foundation for children's learning that takes place during early childhood development and education, where children are stimulated physically and psychosocially (Alderman et al. 2003). Preschool education improves children's cognitive skills and educational attainment later in life which in turn enables higher lifetime earnings, especially among disadvantaged children. Studies such as the one by Heckman et al. (2013); UNESCO (2008) has shown that children who participate in preschool education progress better when at primary school than those who have not benefitted from formal preschool education. These studies imply that access to early child development services is a very important determinant of children's wellbeing. Preschool enrolment with feeding programs is negatively correlated to child underweight and out-of-school children (OOSC), (McGregor et al.2007) and is positively correlated with persistence to the last grade of primary school.

Household characteristics– under-five mortality rates[5]*:* Lack of access to education and low attendance in schools are directly linked to poverty. Low household income is a major factor in keeping children from enrolling and attending school, although school fees have been waived, the high hidden costs of learning materials mostly increase the number of OOSC. UNICEF (2006) indicates that 80% of OOSC come from the poorest 60% of households in Eastern and Southern Africa. A majority of preschool age children from low income families experience little or no access to organised preschool due to the high cost of private facilities.

The impact of child underweight on primary school enrolment: Less than half of all primary school pupils enrol by age 6, most of them do not enrol until age 8 or 9, and child underweight is one of the reasons contributing to the delay in primary school enrolment. Chronic child malnutrition stunts growth and retards cognitive development as well as reduces motivation and energy levels, this consequently contributes to poor school participation, low learning outcomes, high repetition and dropout rates, limited future options and low earning levels and thereby contributes to high poverty levels (Glewwe and Jacoby 1995; McGregor et al.2007). For more information on the impact of undernutrition on primary school enrolment, please refer to Chapter 2, subsection 2.3.2 (i) on "costs of early childhood under-nutrition".

Child underweight is one of the factors contributing to the large numbers of OOSC through the path of poor health that leads to absenteeism from school and consequently bad performance that conditions the students to repeat classes and eventually culminates into dropping out of school. OOSC are poorly trained, may end up in low paying jobs into adulthood, perpetuating poverty into the next generation. This set of children miss out on the opportunity to develop and grow at a crucial age which largely influences future earnings and productivity potentials (UNICEF 2013a; Castillo et al. 2014). The prevalence of underweight among children is positively correlated with factors that positively impact child poverty such as child marriage, orphans, female illiteracy, and negatively correlated with factors that negatively impact child poverty – primary school enrolment, persistence to the last grade of primary school, health expenditure and birth registration.

[5] Under-five mortality rate proxies for child poverty status. In the present context, it connotes that a poor child is assumed to belong to a poor family and therefore household's poverty status influences their decisions concerning their children's education.

Crop production index: crop production has already been explained in subsection 3.1 on child poverty and child health. Crop production as a proxy of availability of food connotes that if there is inadequacy of food, particularly nutritious food it contributes to malnutrition. Nutrient deficiencies lead to body cell depletion which often impairs the immune function (Hughes and Kelly 2006). An impaired immune system exposes children to infectious diseases thereby leading to poor health, lack of concentration in the classroom, absenteeism, poor performance which may eventually culminate to dropout from school. The path of child underweight through mother's low nutritional status largely contributes to stunting in growth and underdeveloped cognitive ability and its consequences on child's education has already been discussed elsewhere in this study.

Ibrahim's Index African Governance: Parliaments have the duty to ensure that national legislation is in line with CRC, in addition to this have to allocate sufficient and equitable resources for social services. The effect of governance on child poverty issues has been discussed in the subsection 3.1 on child poverty and child health. We extend governance's impact on child poverty issues under education by discussing its investment in infrastructure by constructing all season roads to connect rural areas with basic services such as health centres and education; and government's investment in school inputs.

School proximity – paved roads and geographical location: DHS show that school enrolment and attendance is much lower in rural areas than in urban areas, the imbalance is much greater for girls (UNESCO 2011). Remote areas which are sparsely populated relates directly to difficulties of physical access, which adversely affects girls more than boys. These areas are likely to be cut off from infrastructure such as no roads nearby, schools and health centres may be several kilometres away. Due to this, most parents find it unsafe to send young children to school especially girls, and they prefer to wait until the boys are old enough to walk long distances. Late entry in school has a disadvantage of overage pupils who have a tendency to dropout. Fatigue, exhaustion, risk of dangers such as sexual assault and road accidents are some of the contributory factors to non-attendance, irregular attendance and dropouts. Remoteness is a major reason behind millions of rural children of school going age being out of school, they miss out on the opportunity of their right to education. Having paved roads is a good proxy for measuring the impact of remoteness on children's wellbeing particularly education.

Girls out of school: The importance of female education explains the negative effect on primary school enrolment of girls out of school.

Female teachers: There is a growing body of literature (DFID 2005; Kirk 2006) attesting to the positive correlation of female teachers and increasing number of girls enrolling in primary schools. Female primary teachers in rural areas act as role models for girls; they point to opportunities for women to be active outside the home and to be agents in community development. The presence of women in schools can positively impact girls' retention in school and achievement and most probably inspire them to continue to study to become teachers themselves. In some social-cultural set ups, parents will not allow their daughters to be taught by a male teacher, and some mothers feel more comfortable to talk about their children with a female than a male

teacher. Female teachers have an important role to play in providing girls with accurate information about their own bodies and how to look after them.

Gender parity index (GPI): Gender differences in enrolment are mediated through household income. Families in low wealth quintiles may find the cost of sending girls to school to be prohibitive in terms of the provision of school basics as well as the loss of vital help at home. In addition to this, social cultural values mostly dictate that investment in girls' schooling as wasteful since it benefits the family into which a girl marries rather than her own family, therefore preferences are generally given to boys over girls. These partiality decisions have long run consequences evidenced by high percentages of illiterate females in comparison to illiterate males (See table 2.5 in chapter 2 section 2.3.4 on percentages of illiteracy rates by districts in Kenya). The benefits of female's education have a multiplier effect through the channel of controlling fertility rates which is not only to the advantage of the woman's own health by not being depleted but also saving nations and the globe from the consequences of overpopulation. A mother who is not depleted gives birth to healthy children with developed cognitive ability enhancing their performance at school and in the process, saves governments the costs of repeating classes that is common to children with underdeveloped cognitive ability. This phenomenon subsequently produces competent labour force that joins the ranks of economic development thereby leading to declining poverty rates.

Ratio of female to male labour force participation rate: The ratio as evidenced by low GPI is assumed to be low and at the same time, Figure 3.1 on the conceptual framework indicates that women lack access to and use of resources including human resources which comprise education, skills, knowledge and health. These resources are essential for participation in the labour market and women tend not to have them in comparison to men and therefore their participation level is low as compared to men. Low participation in the labour market negatively affects their earnings prospects which in the long-run negatively impacts children's education through mother's low self- esteem. Thus she is not able to participate in the child's education for example by helping with homework or in making financial contribution towards children's education.

Adolescent fertility rate and child marriage: High adolescent fertility rates is one of the factors contributing to incompletion of schooling (Ribar 1994) because schooling system in Africa is yet to make provision for teenage mothers. Therefore, once girls get pregnant they are forced to drop out of school and are mostly forced to get married regardless of their age. Certain social norms do not allow girls to remain in school to completion but they are forced out of school to become young brides. In addition to the known cultural reasons, poor families for example may at times marry off their young daughters in exchange for dowry as a source of income. Adolescent fertility rates compounded with child marriage defeats the quest for universal primary education.

Child labour: Children who are economically active without going to school, are a large part of the children out of school. Working during school hours negatively affects school enrolment and learning outcomes, the competition between work and school more often leads to school dropouts (UNESCO 2010). Girls in rural areas are normally involved in domestic duties such as cooking or fetching water, while boys engage in herding livestock or farm-work. Girls' work schedule usually tends to stretch into longer hours than boys' work and as

a result, girls are at a higher risk of dropping out of school. It is reported that girls aged 13-17 in rural South Africa work 2.5 hours per day, compared with boys, who only work 1 hour per day (Edmonds 2007).

Orphans: The increasing deaths of parents caused by HIV/AIDS has increased the number of orphans in Africa. As a consequence, the rising rates of being orphaned is far above the available social sustenance contributing to a large number of orphans dropping out of school and ending up as child workers, and in most cases girls become victims of child marriage. Orphans are more likely to suffer from stigma and discrimination from their communities and in schools thereby leading to dropouts. A study on orphans in rural Western Kenya found that with a death of a parent, school participation drops and the impact is particularly felt in households with fewer assets (Evans and Miguel 2007). Orphans are positively correlated with OOSC, child marriage, child underweight, and negatively correlated with factors which negatively impact child poverty such as primary school enrolment, birth registration, persistence to the last grade of primary school and agricultural value added.

Persistence to the last grade of primary school: Persistence to the last grade is a proxy for children acquiring basic literacy and numeracy, at the same time reflects the quality and performance of schools. This parameter can point to problems of grade repetition, drop-out, as well as the challenges children face to remaining in school. It is thus a yardstick for determining a government's commitment to children's right to education. The greater the number of pupils persisting to the last grade, the higher the literacy rates, the lower the repetition and dropout rates thereby reducing the number of OOSC which in return reduces child poverty. Persistence to the last grade is positively correlated with primary school enrolment, agricultural value added, birth registration and women's access to credit and is negatively correlated with child marriage, child underweight and OOSC.

Birth registration (Child participation) and mobile phone (information): Birth registration proxies for a child's civil rights of legal access to basic services and freedom of speech and participation in matters that concerns them. Civil registration is a basic tool by which governments count their citizens and plan the number of schools, health centres and other services needed. Most countries require a birth certificate before a child receives immunization, is treated in a health centre and is enrolled in a school. In children's interviews in section 2.2.3, children complained that they were not consulted on matters that affected their lives. Children are asking for the freedom of expression of their views and opinions in matters that concern them (White and Choudhury 2007; Vincent 2008). For children to participate, they need to be equipped with information on their rights. Education underpins a person's ability to access important information and information causes a person to advance in education, and in the first place a person needs to access education, thus information and education are jointly determined. Equipped with education and information, children will demand their rights to healthcare, nutrition, shelter, water, sanitation and leisure. Children understand best what they lack in fulfilling their wellbeing, therefore their ideas, experiences and insights can contribute to adults' understanding and make positive contribution to adults' actions. For instance, children can contribute ideas to the kind of school inputs and school curriculum that will boost pupils' retention in schools.

Women's status (GPI) and child education

Mothers are generally the first caregivers for children, spend more time with the children and naturally help them with homework depending on the mother's education status. Mothers can boost their children's education by creating an educational environment at home through readiness for pre-schoolers and assist in doing homework with those already enrolled in school (Marling 2001). Being regularly involved in a child's schooling produces greater opportunities for improving a child's school attendance, grades and self-esteem. Children whose mothers are illiterate are at a greater disadvantage in their performance at school than their peers with educated mothers. In situations and settings where women are denied access to basic services, essential resources, or information, it is the children who suffer the most because their mothers' lack of access directly deprives them of their capabilities. A majority of reasons like ill health, malnutrition, lack of basics needed to attend school which cause children to be out of school can be minimised by investment in women's literacy. Participants in adult literacy education in Uganda explained that their motive of joining the courses was to acquire skills that would enable them to help their children with doing their homework. Teachers have noted that children of literate parents are more punctual, more regular attendees and appear better groomed. A large body of literature recommends that it is especially important to reach illiterate mothers (Lauglo 2001).

The channel from women's low status to child health, education and poverty

The path from women's low status to child health, education and poverty is depicted in Figure 3.1. The first cluster (1) in Figure 3.1 is the starting point, it consists of economic, political and social-cultural institutions which determine the availability of and accessibility to adequate quantities of quality resources (2). Social institutions tend to discriminate against women and girls through social norms, practices, and formal and informal laws. Social institutions form the basis for human behaviour and social interaction which shape social and economic opportunities for men and women. The actions of economic and political institutions affect children's wellbeing firstly through discriminatory practices (laid down by the social-cultural institutions) that largely contribute to women's lack of access to and use of resources in the third cluster. Women's role as food providers and caregivers is hampered by the lack of access to resources, and this creates a chain of deprivations as evidenced in the fourth cluster. OECD (2006) reports that countries with higher levels of discrimination against women perform poorly on a range of development indicators. Discriminatory practices like inheritance laws, are commonplace in most Sub Saharan African countries**,** evidenced by women's consistently low levels of education, lack assets and other social indicators as compared to men. (Please refer to Chapter 2, Figure 2.1 on recipients of the majority of a deceased husband's assets).

Women's economic advancement has a multiplier effect on household food security because in Africa, women in general have a tendency to be mainly responsible for the provision of food in the household while men have other expenditure responsibilities. Studies such as that by Mahgoub et al. (2006) have reported stronger correlations between pre-schooler weight-for-age and height-for-age and mother's incomes. There is a close correlation between having land rights, food availability and access; and poverty reduction. Social-cultural

practices that limit the access of women to productive resources such as land, credit, inputs and information largely contribute to child deprivations and at the same time imposes real costs on society through lost agricultural output and economic growth.

The effect of women's low status and decision making power on child health, education and poverty

The substantial responsibilities of women for their own wellbeing and that of the members of their household, particularly the young children, are portrayed in subsections of the present chapter on "care, women's status and child health; and women's status and child education". See also the literature review in Chapter 2 in which rural women's duties as well as their lack of access to productive resources are discussed. Women's status is low relative to men's status, and their low status is a consequence of not having the same access as men to productive resources. Lack of access to resources limits their negotiating and bargaining power in decision making and thus women tend to have little control over household time and income. Women who are expected to do both farm work and household chores are eventually left with limited time for the health and nutritional needs of their children. Also, being faced with time constraints, they may have limited time for social networks and thus women may not have social support to relieve the constraints. Having time constraints is also an obstacle to accomplishing their numerous tasks. Since social norms dictate specific tasks for women and men, women are forced to get their older daughters out of school to look after the younger children in order for women to have time to attend to the other tasks. Women's lack of access to human resources may limit their knowledge, leading to inappropriate beliefs, for example about feeding practices of the child and healthcare issues, thereby putting child's health at risk. Their low status can contribute to poor mental health, low self-confidence and low self-esteem and thereby defeat the purpose of fulfilling their responsibility as caregivers, subsequently leading to repercussive effects on women's and children's wellbeing.

Women with greater control over household economic resources, are able to weigh up the costs and benefits of alternative uses of the resources at their disposal and can choose the option with optimal benefits for the members of their households. For instance, a woman with greater control over household resources is in a position to make use of health services in the case of a sick child; she can make purchases of the right food for her family; she also has less stress and therefore has mental stability to assist her children with homework and create an enabling environment for the growth of her children. The literature review in Chapter 2 pointed out that women tend to spend more of their income on food as compared to men. A study by Simister (2009) in South Africa assessed the claim that children tend to fare better in terms of food and clothing if their mothers have an income comparable to their fathers; he found that children's wellbeing was better in households where mothers had a stable adequate income. Women's control over resources gives them the power to make decisions such as family planning. Spacing children improves a mother's health, and a healthy mother is more likely to give birth to healthy children.

3.3 Under-five mortality rate (child poverty)

Reasons for using the under-five mortality rate as a proxy for child poverty are explained in Chapter 4 on econometric models, methods and data. Poverty is associated with inadequate food, poor shelter, poor sanitation, and lack of access to health facilities that lead to increased infections and underweight children. Poverty is also associated with a lack of access to education or poor development on enrolment in school. These lead to poor school achievement, which is further exacerbated by poorly funded schools and poor family support largely due to economic stress.

Primary school enrolment: Among the benefits of education is information on maintaining good health, it gives prospects of better employment with income that enables access to good housing facilities, food, healthcare and education, these benefits are negatively correlated with U5MR (child poverty).

Child underweight: It has already been pointed out in the subsection on child poverty and education that malnutrition weakens the immune system, making the victims more susceptible to diseases which may lead to U5MR. Also, low birth weight children tend to have underdeveloped cognitive ability which may become a challenge in finding gainful employment and this can subsequently positively impact child poverty.

GDP per capita and wealth quintile: GDP per capita is a commonly used international indicator of wealth. Countries with sound macroeconomic policies for economic growth and a more equal distribution of income experience declining poverty levels caused by rising growth. Economic policies that improve the distribution of income and assets within a society, such as land tenure reform, pro-poor public expenditure, and measures to increase poor people's access to financial markets can largely cut down child deprivations. Poverty reductions are evidenced through channels like the creation of income generating opportunities thereby reducing unemployment levels. Although the multidimensional nature of child poverty has more to do with deprivations which cannot be measured in monetary units, incomes are crucial in meeting most of the needs of child wellbeing. Higher incomes at household levels enable household members to acquire more calories and parents have the opportunity to invest more in nutrition, health and school equipment for their children (Dorosh and Mellor 2013; Cunguara and Hanlon 2012).

Health expenditure per capita: Public expenditure on basic services such as health, education, housing, water, sanitation and infrastructure enables all consumers to access these services, meet their immediate needs in the short run and develop human resources in the long run which is beneficial not only at individual level, but also at community and national levels. Primary healthcare investments in health and nutrition effectively improve children's health status. Countries with large health expenditure have large declines in child mortality rates. Large public expenditure allocated with prudence is negatively correlated with U5MR, child underweight and OOSC and is positively correlated with school enrolment rates and agricultural value added.

Ethno-linguistic fractionalisation (ELF) and women's access to credit: There is a tendency for women particularly in rural areas to form women's groups based on their ethnicity. The objectives of these groups are normally to improve the wellbeing of the members. Group members agree on a fixed sum of money to contribute weekly or monthly. The contributed amount is at the disposal of the group members to borrow at minimal interest rates. This gives financial opportunities to women who would otherwise never have been able

to access credit from lending institutions because of not meeting requirements such as collateral. Social networking through women's groups gives women information on hygiene and better health practices, among other things. Since women's time is constrained, members of the group make the best of their limited time by helping each other in for example weeding or harvesting. Improved women's status through women's access to both essential information and credit boosts mothers' wellbeing which is connected to children's nutrition through pathways such as prenatal care and complementary feeding practices for children. Better access to credit facilities enables women to engage in various income generating activities in which they are likely to reap profits and can use the proceeds to invest in their children's health and education. From this aspect, ELF is negatively correlated with child poverty since women have both social capital and funds to venture into investments. On the other hand, ELF is used as a proxy to measure the quality of institutions in Africa (Alesina et.al 2003) because it is assumed countries that are highly fractionalized tend to face instability because of disagreement in decision making such as budget allocation, the major ethnic groups tend to dominate which in some cases affects the quality of institutions. In this aspect, ELF increases child poverty.

Girls out of school and mother's education: The girls of today are future mothers, thus being out of school reverses all the benefits of female education and reinforces the negative effects of female illiteracy. Notwithstanding the fact that the social cultural norms that limit women's access are deeply entrenched, rural women's illiteracy exacerbates their limited access to resources because they miss out on the essential information transmitted through literacy and numeracy. Illiteracy is a barrier to accessing information necessary to qualify for credit, and as a consequence, large proportions of illiterate women suffer from financial difficulties. Employment opportunities are limited due to their low education levels, lower skills and thus are further disadvantaged in competing in labour markets for higher income earning jobs. Consequently, they may end up taking less stable, less rewarding jobs. These factors associated with female illiteracy suggests that girls out of school and female illiteracy positively contribute to U5MR, child underweight and negatively contribute to primary school enrolment and female employment in agriculture.

Agricultural value added: Notwithstanding the fact that economic growth is an important contributor to child poverty reduction, the *sector mix* of growth matters substantially. Sector mix is crucial in the case of Africa which has the majority of its deprived children living in rural areas where the agricultural sector plays a decisive role as a source of both nutritious food and income. Enhancing the value of agricultural products is of great importance in reducing child poverty through rising incomes, employment generation, rural non-farm multiplier effects and food price effects. Declining food prices due to increasing output translate into an increase in real income for food buying households and thus increase the resources available for consumption purposes. These resources can be used to diversify food consumption by adding nutritionally rich foods to the households' diet. Agricultural value added is positively correlated with primary school enrolment, public expenditure and negatively correlated with the U5MR, child underweight, child marriage and girls out of school (Gollin 2010; Schneider and Gugerty 2011).

Female employment in agriculture: A large proportion of the rural population in Africa have agriculture as their main occupation, with women being the majority because men have migrated to the cities in search of

work. This therefore suggests that women's gainful employment in agriculture is a determinant factor in child poverty reduction. The literature review in Chapter 2 indicated that growth elasticity of poverty is consistently larger when growth is driven by agricultural growth than non- agricultural growth. The literature review has also pointed out that women tend to spend more of the income they control on food, healthcare and their children's education, while men spend more of their income on assets.

Gender parity index and participation in making major decisions in the household: Women's participation in decision making is mostly determined by their negotiating and bargaining power, and negotiating and bargaining power mostly depends on asset ownership. Since Figure 3.1(conceptual framework) shows that women lack access to resources which generate assets, it can be assumed that women mostly have low levels of participation in making major decisions in their households and as a consequence their interests and those of their children are not well represented. This subsequently causes their low status to have a positive impact on child poverty thereby increasing high rates of underweight children and high under-five mortality rates.

Rural sanitation: Access to good sanitation reduces the incidence of waterborne diseases such as diarrhoea, cholera, dysentery, typhoid, guinea worm and hepatitis in children. Most of the diseases in question affect sick children's appetite, lead to loss of weight and retardation in growth and at the same time lead to malnutrition as well as reinforcing the effects of malnutrition (Behrman et al. 2004b). Latrine and drainage sanitation affects children's wellbeing; for instance, children living in households without latrines in their vicinity and poor drainage are at a risk of getting infections through playing in a contaminated environment. Good rural sanitation reduces U5MR, increases school enrolment, reduces girls being out of school and in the long run reduces child poverty.

3.4 Conclusion: Interrelatedness between under five mortality rate, child underweight and primary school enrolment

Definitions of child poverty point to the multifaceted and interdependent nature of children's basic needs. Child deprivation factors like health, education, food, water, sanitation, shelter, leisure and information are interrelated and also interlinked with one another through the pathway of causality. At the top of Figure 3.1 is a triangular box with bi directional arrows running from U5MR to child underweight, to primary school enrolment and vice versa. The interrelatedness of U5MR, child underweight and primary school enrolment portrayed in that triangular box combined with the foregoing discussion on how the factors affecting child poverty are interlinked and correlated, suggests that child poverty can be summed and measured from the health and education aspects of deprivation approach using indicators that are either proxies for or correlated to health and education. Child underweight affects primary school enrolment partly through the path of mother's low nutritional status which largely contribute to stunting in growth and underdeveloped cognitive ability. These consequences of child underweight are firstly the major causes behind delayed school entry, overage children who mostly tend to end up being out of school, and being out of school especially for girls largely encourages child marriages. Child marriages risk the lives of both the mothers and children which may increase both maternal mortality and child mortality rates. Secondly the consequences of child underweight such as underdeveloped cognitive ability contributes to a child's poor performance at school. Nutrient

deficiencies lead to an impaired immune system which exposes children to the risk of diseases which if not controlled can increase child mortality rates, and at the same time may cause poor health, lack of concentration in the classroom, absenteeism, repeating grades and lower educational attainment.

Using the U5MR as a proxy for child poverty status connotes that a poor child is assumed to belong to a poor family, and a household's poverty status influences parents' decisions concerning their children's education. Low household income largely causes children not to be enrolled in or to attend school, although school fees have been waived. Other hidden costs, such as the cost of learning materials, increases the number of out of school children. Poor families in general cannot afford to access nutritious food or for that matter adequate food, and this consequently increases the number of underweight children. It can be said that poverty (U5MR) is associated with both a lack of access to primary school enrolment as well as a lack of access to adequate nutritious food. Conversely, primary school education may lead to better prospects of earning, and it thereby enables families to access good housing, food and healthcare and in the process, education is negatively correlated with both child underweight and the level of poverty (U5MR). A major direct impact of education on child underweight is through enrolment in preschools with complementary health, nutrition and cognitive stimulation programs which contribute to the improvement of nutritional status and cognitive development of underweight children. If children have improved cognitive skills, this has a positive impact on their educational attainment later on in life, which may subsequently enable them to have higher life time earnings which in the long-run, has a negatively correlation with child poverty.

However, it should be noted that the interdependent nature between the U5MR, child underweight and primary school enrolment is largely affected by other underlying causes such as food shortages and lack of economic access to food, the low status of women and the lack of access to school and healthcare services. The underlying causes are mostly the outcomes of institutional actions, for instance girls being denied the opportunity to finish primary school is due to social cultural norms that prefer sons over daughters. Children's health and education status partly depends on public expenditure on education and health, while public expenditure depends on economic growth. Lack of access to DPT_3 vaccinations could be partly because of tertiary health expenditure taking pre-eminence over primary health expenditure. Agricultural productivity depends on economic policies as well as on social cultural institutions that limit rural women's access to productive resources such as education, land and credit. Orphans have limited access to enrolment in school partly because of their lack of voice (birth registration) to inherit their deceased parents' property. The conceptual framework with the U5MR, child underweight and primary school enrolment at the apex and institutions at the bottom, suggests that child poverty solutions have to be worked out from the bottom up. The framework suggests that answers to this study's questions call for the analysis and measurement of the causes of child poverty simultaneously. Focus on any one major cause (for instance, primary school enrolment) without giving due attention to child underweight and U5MR may fail to produce the desired results.

4. METHODS, ECONOMETRIC MODEL, AND DATA

"If development is to assume a more human face, then there arises a corresponding need for a means of measuring human as well as economic progress. From UNICEF's point of view, in particular there is a need for an agreed method of measuring the level of child wellbeing and its rate of change" (UNICEF 2002).

Chapter 4 explains the methods such as Principal component analysis (PCA), Agglomerative hierarchical clustering (AHC), 2SLS (Two stage least squares) and 3SLS (Three stage least square) used to carry out the investigation. Econometric model, data and construction of variables are also explained.

4.1 Methods

4.1.1 Principal component analysis (PCA)

Generally, there is a tendency for there to be multiple interdependencies among child poverty variables. We therefore applied principal component analysis (PCA), a dimension reduction technique to investigate the pattern of correlations. The results from PCA have been used to measure and compare factors affecting child poverty in chapter 5 and also in Chapter 6 for the whole time period 1990-2010, in choosing variables for the econometric model.

Principal component analysis (PCA) is a multivariate statistical technique generally applicable in cases with numerous variables which tend to be redundant due to being correlated with one another in measuring the same construct. PCA removes both redundant variables and variables that did not load on to any of the chosen components; it transforms original variables into a few composite indices thereby creating a small number of uncorrelated principal components which account for most of the variance in the observed variables. The weights of respective components are given by the eigenvectors of correlation matrix. The variance of each principal component is given by the eigenvalue of the corresponding eigenvector (the Eigenvalue for each principal component indicates the percentage variation in the total data explained), (Bryant and Yarnold 1995).

The observed variables are standardized in the course of the analysis in the sense that each variable is transformed to a mean of zero and a variance of one. Total variance in the dataset is the sum of the variances of these observed variables, and since they are standardized to have a variance of one, each observed variable contributes one unit of variance to the total variance in the dataset. PCA is useful in eliminating dimensions that contribute the least in the variation of the dataset and retains only those dimensions with most variations, the dimension with the highest variation becomes the principal component subject to the constraint that the sum of all the squared weights is equal to one (Brown 2009).

The sum of eigenvalues equals the number of variables in the initial dataset, and the proportion of total variation in the original dataset accounted for by each principal component is estimated by dividing the eigenvalue of respective principal components by the sum of the eigenvalue. The cumulative percentage is the addition of the variation of the first principal component with the second principal component, for example, and the sum of the two indicates the percentage of variation the two components explain. The variation of the third component is added to the sum of the variation of the first two components to get the percentage

accumulation of the first three components and this procedure is carried on until the last principal component. It should be noted that subsequent components are uncorrelated with previous components; each component captures additional dimensions in the data but explains smaller and smaller proportions of variations of the original variables. A high degree of correlation among the original variables leads to having fewer components to capture common information (Bro and Smilde 2014; Vyas and Kumaranayake 2006).

Steps in conducting principal component analysis

We derived data from DHS for the most recent years (maximum of five-year period, but most countries had less than five years' data) with the objective of identifying and weighing the most important indicators of child poverty. The statistical software used was XLSTAT. PCA works best when the variables are both correlated and their distribution varies across cases, or in this instance countries. It is the variables that are more unequally distributed between countries that are given more weight in PCA (McKenzie 2003). A variable that is equally distributed across countries thus having nearly zero standard deviation would exhibit no variation between countries and would be zero weighted and thus defeat the purpose of PCA.

Therefore, as a first step, we carried out descriptive analysis for all the variables, looking at means, standard deviations and correlations (Appendix 1 Tables 3 and 4). The percentage of countries with missing values was less than 1% and thus we replaced missing values with the mean for that variable. Descriptive analysis can inform decisions on which variables to include in the analysis. Although our data were expressed in the same units (percentages), we ran the analysis using the correlation matrix, and used varimax rotation, a technique that returns factors that are orthogonal. It also facilitates the interpretation of correlations between variables and components by determining which construct seems to be measured by component 1, component 2, component 3 and so forth. This is done by identifying the variables with high loadings for a given component and determining what these variables have in common. The entries in the matrix are referred to us factor loadings (when a variable is given a great deal of weight in constructing a component, it is said that the variable loads on the component) a common term given to the coefficient that appears in the factor pattern matrix.

The second step is the extraction of components, and the number of components extracted is equal to the number of variables being analysed. The first component is assumed to account for a fairly large amount of the total variance, with successive components accounting for progressively smaller amounts of variance and therefore only the first few components are retained for interpretation. An eigenvalue represents the amount of variance that is accounted for by a given component. The first column in the matrix presents information about the first component extracted, and so forth.

The third step is to determine the number of meaningful components to be retained. The criteria for determining the number of components to be retained for interpretation are (1) The eigenvalue-one criterion (Kaiser Criterion) requires that each observable variable should contribute a minimum of one unit of variance to the total variance in the dataset. (2) The number of components retained should account for 70%-80% of the

cumulative variance in the data set. (3) Any of the above criteria chosen should consider that (a) there are at least three variables with significant loadings on each retained component; the cut-off minimum point of loading on the component tends to range 0.30-0.40; (b) the variables in any single component should share the same conceptual meaning (measure the same construct); and (c) variables in different components measure different constructs and most of the variables should have high a loading on only one component and the rest of the components should load below the cut-off point (Bro and Smilde 2014). Once components are chosen, a factor pattern matrix is created with rows representing the variables being analysed and columns representing the retained components. These components are referred to as factor1, factor2 in the output.

4.1.2 Agglomerative hierarchical clustering (AHC)

Cluster analysis belongs to a group of multivariate statistical methods which generally group objects based on the characteristics they possess. It classifies a large quantity of information into meaningful smaller subgroups called clusters which are more manageable and easier to interpret than individual data. Clusters are characterized by high internal homogeneity and high external heterogeneity (Hair et al. 2009), and therefore this enables the minimization of variability within a cluster and maximization of variability between clusters. Observations (objects) within the clusters will be close together (similarity) while the distance between clusters will be further apart. The first step in AHC is to look for the pair of samples that are most similar, that is that are closest in terms of having the lowest dissimilarity. The two samples are joined together at their lowest dissimilarity, and the point at which they are joined is called a node. In each subsequent step, two existing clusters are merged into a single cluster, this is done repeatedly until all the samples are in a single cluster (that is from n clusters to 1) similarity between the observations decreases during successive steps. The process is termed a hierarchical procedure because it moves in a stepwise fashion to form an entire range of cluster solutions. It is also an agglomerative method because clusters are formed by combining the existing clusters.
Hierarchical agglomerative clustering consecutively forms clusters from objects. Each object represents an individual cluster and clusters are merged based on their similarities. In the present study, countries with the smallest distances are merged into a new cluster at the bottom of the hierarchy and the next step merges another pair of clusters linked to a higher level of the hierarchy. This process allows a hierarchy of clusters to be established from the bottom up and clusters are combined at every step, thereby gradually reducing the number of clusters and finally ending up with only one cluster at the top.

The results of cluster analysis are summarized using dendrogram graphical representation (i.e., a tree graph). In dendrograms, distance is plotted on one axis, while the sample units are shown on the remaining axis. The tree shows how sample units are combined into clusters, with the height of each branching point corresponding to the distance at which two clusters are joined (Mooi and Sarstedt 2011). We calculate the distances between objects using Ward's method because of its analysis of the variance approach that evaluates the distances between the clusters with the application of Euclidean distance as the distance of similarity measure between two data points (between countries) then links the clusters. Country similarity or dissimilarity is found by

estimating the distance between the countries: smaller distances between countries implies they are similar, while larger distances implies they are dissimilar. Hierarchical clustering puts together countries that have smallest distance in the sense that they have similarities and are thus classified under the same cluster.

How many clusters do we form? The cut-off point of the classification tree to determine the number of clusters is a subjective process. In defining the partition from the tree built by using a hierarchical clustering algorithm, normally one looks for gaps (jumps) between joining along the axis as an indication of dissimilarity. A large increase in the distance (a large jump) of the clusters being joined implies that the two clusters have resulted a single cluster that is markedly less homogenous, which connotes the objects within it have less similarity. Therefore, we should not form this cluster but instead stop clustering because the increase in dissimilarity level is strong. The height of the node at which the tree has to be cut is mostly just before a large jump in the height values. The point at which there is no further clustering is the cut-off point, and the standard practice is to cut the tree horizontally at this point (Boudaillier and Hebrail 1998).

We use pre-treated data of a five-year period of factor scores of African countries in factors affecting child poverty generated by PCA to cluster countries using AHC. Twenty-eight countries are now under observation instead of 30, because Guinea Bissau and Mauritius have no DHS data for the variables under investigation. Factor scores are responses weighted by the factor loadings, showing how each variable relates to the principal component. The factor weights are used in conjunction with the original variable values to calculate a score for each observation**.**

4.2 Two stage least squares (2SLS) and Three stage least square (3LS) **methods**

The basic assumptions of the model concerning the way in which observations are generated are:

(1) The model is linear in parameters, this implies that the dependent variable can be calculated as a linear function of a specific set of independent variables, plus a disturbance term.

$$y_t = \beta_0 + \beta_1 \chi_t + \varepsilon_t \qquad (4.1)$$

(2) Disturbance terms all have uniform variances and are uncorrelated.

$$\varepsilon(\varepsilon_t, \varepsilon_r) = \sigma^2, \text{ t = r} \qquad (4.2)$$

$$\varepsilon(\varepsilon_t, \varepsilon_r) = 0, \text{ t} \neq \text{r}$$

Violations of this assumption causes heteroscedasticity, whereby the disturbances do not all have the same variance. Autocorrelation is also a resultant of the violation, in this case disturbances are correlated with one another.

(3) The number of observations is greater than the number of independent variables. In addition to this, there is no exact linear relationship between independent variables. Violation of this assumption results into multi-collinearity.

The basic assumptions of the model have been tested in the following way:

1. The model is linear in parameters: Best indicators of an omitted variable are the theoretical underpinnings of the model itself - what variables must be included, what signs are expected. Economic theory has been the criterion for the choice of the appropriateness of independent potential variables and also on how close they are linked to children, women and institutional activities, and on how well they fare together. We included more variables than thought necessary and then tested down to obtain a final specification. The critical value of relevant "t" and "F" statistic has been used to operationalise the testing procedure at 5% value. Also, since any cyclical movement in an omitted variable is transmitted to the OLS residuals, tests of serial correlation in the errors have been used to detect omitted variables. Omitted country-specific effects are known to lead to inconsistent empirical estimates, the estimated coefficients on variables of interest retained their signs and statistical significance, pointing to their robustness. The large representative sample is less prone to sampling variability and hence more reliable. Since our sample is large, we assume it is more reliable.
2. The data are a random sample of the population- errors are statistically independent from one another. Autocorrelation plots have been carried and the results indicate that the residues are not correlated. Durbin Watson tests have been carried and they showed that the errors were independent of one another.
3. The expected value of the errors is always zero. Partial residual plots have been done, and residues have been found to be around zero.
4. The independent variables are not too strongly collinear; correlation matrix tables of these variables show no strong correlation.
5. Errors are normally distributed: Residual plots were done to test for normal distribution. The normal probability plot suggests that the errors in the regression are normally distributed. In addition to these normality tests have been done and found normal distribution.

4.2.1 2SLS

The estimation of structural parameters in a simultaneous equation model can only be carried out if the equation has been identified. In cases of exact identification, the method applied is indirect least squares (ISL), whereas in situations of over-identified equations as is the case in the present study, the two stage least squares (2SLS) method is applied. 2SLS method replaces the stochastic endogenous regressor with one that is non-stochastic and independent of the error term.

The name of 2SLS suggests that it is calculated in two stages- the 1st stage regresses each endogenous variable which is a regressor as well on all the endogenous variables in the system using OLS, (this exercise is equivalent to estimating the reduced form equations) and obtains the fitted values of the endogenous variables of these regressions ($\hat{Y}$). The 2nd stage uses the fitted values from 1st stage as proxies or instruments for the endogenous regressors in the original (structural form) equations, (Asteriou and Hall 2007).

Properties of 2SLS – (a) it estimates only those equations that pass the identification condition, (b) the results are said to be consistent since 2SLS is known to be a legitimate instrumental variable estimator, (c) Monte Carlo studies have noted that 2SLS has small sample properties superior in most cases to all other estimators,

(d) it has also been found to be robust in the sense that its properties are insensitive to the presence of other estimating problems like multicollinearity and specification errors. These properties have made 2SLS most preferred estimator of all simultaneous equation estimators.

4.2.2 3SLS

3SLS is a system that combines multivariate regression generally known as Seemingly Unrelated Regression (SUR) with the 2SLS system. The 3SLS estimator obtains instrumental variables taking into account covariance across equation disturbances. Unlike the 2SLS estimator which estimates the coefficients of each structural equation separately, the 3SLS goes a step further by estimating all coefficients simultaneously.

Zellner-Theil (1962) proposed that an efficient estimation of 3SLS should be done in three stages. The first stage is to obtain the residuals of structural equations by 2SLS of all identified equations, the second stage is to compute the optimal instrument or weighting matrix using the estimated residuals to construct the disturbance variance-covariance matrix. The third stage is the simultaneous estimation of the system of equations using the optimal instrument. The 3SLS is largely asymptotically more efficient than 2SLS, for example in estimating a single equation under the assumption that the system of equations is correctly specified.

The properties of 3SLS are (a) Linear structural equations in M are jointly dependent variables and predetermined variables. (b) It solves the problem of jointly dependent variables and thereby enables the existence of reduced form. (c) The disturbances of structural equations have a zero mean, are serially independent and are "homoscedastic" in a way that their variances and "contemporaneous" covariance are finite and consistent through time. (d) All equations are identifiable. (e) Each equation of the system is at least just-identified. Equations that are under-identified are discarded. (f) Estimates are consistent and asymptotically normal, and under some conditions asymptotically more efficient than single equation estimates variables.

Econometrically, we employ Simultaneous Three Stage Least Squares and fixed effects model with the help of panel data methods to run the econometric regressions of the three equations in section 4.3 simultaneously. The three equations (4.5a-4.5c) are in line with the research questions in section 1.7 of Chapter1, to answer the portion of the research question on "to what extent these factors affect child poverty". We have followed Smith and Haddad (2014) in elasticity ranking to gauge the potency of respective variables in affecting child poverty. Measurement of elasticity: Each coefficient is multiplied by the ratio of the data mean of the independent variable to the dependent variable.

The statistical package used is NLOGIT5 version 5. Missing data are very common in panel data sets. Panels in which the group sizes differ across groups are not unusual, and these panels are called unbalanced panels. Data on child poverty in SSA are scarce and this has given rise to unbalanced panel data. The total number of country-year observations is not consistent and it entirely depends on variable combinations. NLOGIT5 deletes all missing data and reports only the variable combinations with complete data.

Endogeneity

The discussions on expected signs in section 4.4.3 with the help of Table 4.3 and the conceptual framework in Chapter 3 points to the interdependence and reverse causality among the dependent and independent variables, thereby raising the issue of endogeneity. This has resulted in this subsection being dedicated to endogeneity. Reverse causality creates endogeneity in the measurement of child poverty using U5MR as a dependent variable and independent variables of primary school enrolment rates and child underweight. High primary enrolment rates are assumed to reduce child poverty because of the benefits of education. While high percentages of OOSC are assumed to increase child poverty because of lack of education. However, there is the probability of reverse causality. High levels of poverty may cause children from poor families not to be enrolled in school because of a lack of funds to meet schooling costs, thereby leading to low primary school enrolment rates and increasing numbers of OOSC.

Children from poor families tend to suffer from malnutrition (child underweight) because of their lack of access to adequate nutritious food, thus child poverty contributes to child underweight. While child underweight contributes to child poverty because malnourished children generally have poor health that affects school attendance, concentration while at school which leads to poor performance and in the long run, affects earning potential in adult life. Simultaneous causality bias takes place when causality runs both from X (primary school enrolment) to (U5MR) Y and from Y to X. It is possible that one part of X is correlated with the error term (Ɛ), and this causes inconsistency in the estimated coefficient of X, whereas the other part is uncorrelated with the error term. To determine the correlation between X and Y requires a knowledge of the variations in X that are uncorrelated with the error term. These are the variations that cause changes in Y. The coefficients of primary school enrolment and child underweight are the endogenous variables suspected to be correlated to the error term. We have solved the endogeneity issue by running simultaneous equations model consisting of three equations U5MR, primary school enrolment and child underweight with the help of the 3SLS. As already pointed out in section 4.2.3, 3SLS uses a system that combines multivariate regression generally known as Seemingly Unrelated Regression (SUR) with the 2SLS system.

Fixed effects and random effects

Omitted variables may lead to changes in the cross-section and time series intercepts. We have added dummy variables to models with fixed effects to allow for these changing intercepts (equations 4.5a-4.5c in section 4.3**)**. Fixed effects can be taken as the effects of omitted individual-specific variables when they are treated as fixed constants over time. We have assumed fixed effects, thereby imposing time independent effects for each region, with the aim of controlling for unobserved heterogeneity. We have used a regional-specific dummy variable to allow for effects of those omitted variables that are specific to respective regions (to capture regional specific effects). Because the number of regions is four, a total of three dummies has been employed. We have used Central Africa as our region to compare with East Africa, West Africa and Southern Africa. We have assumed that there are no time specific effects and chose to focus on individual specific effects.

Assuming fixed effects is advantageous because firstly, it estimates and eliminates from the disturbance term all the unobserved, time-variant regional characteristics and thus eliminates the biases in the estimated coefficients, which may cause the estimated coefficients to be either higher or lower. Secondly, it controls for measurement errors and non-comparability in the data due to definitional and measurement differences at the country level (Ravallion and Chen 1997). Thirdly, the fixed effect model allows the unobserved individual effects to be correlated with the variables included in the model. However, it is not without disadvantage. Firstly, too many dummies may aggravate the problem of multicollinearity among the regressors. Secondly, when the number is large, the use of fixed effects leads to loss of degrees of freedom. The fixed effects model is appropriate because respective regions under this study have specific characteristics which have moulded them into being what they are. It is these individual effects that help explain the differences in the magnitude of child poverty across the regions and countries of Africa as is evident in the succeeding section 6.2 of Chapter 6, in which progress in child poverty issues have been analysed and why some regions and countries have performed better than others.

4.3 Econometric model

We have used the under-five mortality rate (U5MR) as a dependent variable to measure child poverty. U5MR is the probability expressed as a rate per 1,000 live births that a new-born baby will die before reaching age five, if subject to current age-specific mortality rates. U5MR has been chosen by UNICEF as its single most important indicator of the state of a nation's children and human development. The reasons for this are that U5MR measures an end result of the development process rather than being an input such as school enrolment level or per capita calorie availability, which are means to an end. U5MR is said to be the result of a wide variety of inputs like:

(1) (i) the nutritional health and the health knowledge of mothers (ii) the level of immunization and oral rehydration therapy (iii) the availability of maternal and child health services including prenatal care (iv) income and food availability in the family (v) the availability of clean water, safe sanitation (vi) the overall safety of the child's environment.

(2) U5MR presents a more accurate picture of the wellbeing of the majority of children, particularly their health status (including the society in general).

(3) U5MR and its reduction can give a picture of the progress being made by any country towards the satisfaction of the most essential human needs.

(4) In Africa, hunger kills more children than the infectious diseases HIV/AIDS, malaria and tuberculosis put together, and in addition to this, undernutrition magnifies the effect of every disease. Poverty is known to be the principle cause of hunger; thus, it is presumed that most child deaths largely reflect the family's state of poverty.

U5MR as an accurate measure of children's wellbeing is used by UNICEF to rank the nations of the world not in ascending order of their per capita GNP, but in descending order of their under-five mortality rates (UNICEF

2008). For these reasons we have chosen U5MR as a more appropriate and accurate measure of child poverty in Sub Saharan Africa.

The structural equation-

$$Y = \beta_1 X_1 + \beta_2 Y_2 + \varepsilon \quad (4.3.1)$$

$$Y_2 = Y + X_2 \quad (4.3.2)$$

This model is simultaneous because Y and Y_2 are jointly determined, they are endogenous, but X_1 and X_2 are exogenous.

The reduced form equation is

$$Y = \beta_1 + \beta_2 (Y + X_2) + \varepsilon \quad (4.4)$$

$$Y = \pi_{11} X_1 + \pi_{21} X_2 + V$$

$$Y_2 = \pi_{12} X_1 + \pi_{22} X_2 + V$$

Y is U5MR, the indicator that proxies for child poverty, Y_2 represents the vector of endogenous variable – such as primary school enrolment and child underweight. X_1 is the vector of exogenous variables and X_2 includes the set of instrumental variables and π s are reduced form parameters.

U5MR and primary school enrolment are jointly determined and are therefore endogenous variables. The consequences of the relationship between them can be explained by observing an increase in the error term. Suppose for example in equation 4.3.1, that there is an increase in the error term, this will increase Y due to equation 4.3.1. An increase in Y is likely to cause an increase in Y_2 due to the relationship in equation 4.3.2, and the increase in Y_2 in 4.3.2 will simultaneously increase 4.3.1 where it is an explanatory variable. This turn of events implies that primary school enrolment rate (Y_2) is correlated to the error term thereby violating the assumption of no correlation between the error term and all the explanatory variables in the equation, and this may lead to biased and inconsistent estimates.

Identification problem

The reduced form equation expresses endogenous variables as functions of exogenous variables only (X_1 and X_2), and thereby enabling the use of Ordinary Least Squares (OLS) to obtain consistent and efficient estimations of the reduced form parameters (π s). How will OLS obtain these estimations; can it be done by going back to solve for those parameters? Three possibilities arise (a) it is not possible to go back from the reduced form to the structural form (under identification), (b) or to go back in a unique way (exact identification) and (c) there is more than one way to go back (over identification) (Asteriou and Hall 2007).

Generally, different sets of structural parameter values can give rise to the same set of reduced form parameters. In this way, the knowledge of reduced form parameters does not enable the identification of the correct set of structural parameter values. This means going back is not helpful in deriving estimates of the structural

parameters from the estimators of the reduced form coefficients, this situation leads to what is referred to as the identification problem (Kennedy, 2003). The implications of identification are (a) with an under-identified equation, it is impossible to estimate all its parameters with any econometric technique and (b) whereas with identified equation, generally most of its coefficients can be estimated, depending on whether it is exactly identified or over-identified.

Conditions for identification:

(1) The order condition – where G is the number of endogenous variables in the system, M is the number of variables missing from the equation under consideration which can be either endogenous or exogenous. The order condition is stated as (a) M <G-1 the equation is under-identified; (b) M = G-1 the equation is identified and (c) M > G-1 the equation is over-identified. The order condition is necessary because it determines if the equation is identified or over-identified, but there is uncertainty which thus requires the rank condition to be added.

(2) The rank condition – a matrix exercise is carried with columns representing individual variables and rows individual equations. For each equation, there is either a tick or zero in the column depending on whether the variable in the column is included in the equation or not, thus respective equations have arrays of ticks and zeros. The row of each equation under consideration is deleted while noting down the columns with zero in the equation being examined. The resulting array is considered in cases where G -1 rows and columns are not all zeros then the equation is said to be identified, contrary to this the equation is said not to be identified. The rank condition which is sufficient, can only be performed after fulfilling the order condition (Asteriou and Hall 2007).

The general equation

(a) U5MR= f (PSE, CU, WS, OSEF) (4.5a)

U5MR (Under 5 Mortality Rates per 1,000 live births) is the dependent variable. PSE (primary school enrolment), CU (child underweight), WS (women's status) and OSEF (other social economic factors) are explanatory variables.

(b) *PSE = f (U5MR, CU, WS, OSEF)* (4.5b)

PSE is the dependent variable, while U5MR, CU, WS and OSEF are explanatory variables

(c) *CU = f (U5MR, PSE, WS, OSEF)* (4.5c)

CU is the dependent variable, while U5MR, PSE, WS and OSEF are explanatory variables.

Regression equations

(a) $U5MR_t = \alpha_0 + \alpha_1 * PSE_t + \alpha_2 * CU_{t-1} + \alpha_3 * GPI_t + \alpha_4 * FAG_t + \alpha_5 * AGV_t + \alpha_6 * HE_t + \alpha_7 * RS_t + \alpha_8 * ELF_t + \alpha_9 * GOS_t + \alpha_{10} * WA_t + \varepsilon_{1t}$ (4.6a)

(b) $PSE_t = \beta_0 + \beta_1 * U5MR_t + \beta_2 * CU_t + \beta_3 * GPI_t + \beta_4 * CPI_t + \beta_5 * PRD_t + \beta_6 * PLG_t + \beta_7 * CL_t + \beta_8 * GOS_t + \beta_9 * IIAG_t + \beta_{10} * ORP_t + \beta_{11} * FPST_t + \beta_{12} * MPH_t + \beta_{13} * SA_t + \beta_{14} * WA_t + \varepsilon_{2_t}$ (4.6b)

(c) $CU_t = \gamma_0 + \gamma_1 * CU_{t-1} + \gamma_2 * U5MR_t + \gamma_3 * PSE_t + \gamma_4 * GPI_t + \gamma_5 * CPI_t + \gamma_6 * CPI_{t-1} + \gamma_7 * FSV_t + \gamma_8 * WF_t + \gamma_9 * MA_t + \gamma_{10} * OOSC_t + \gamma_{11} * MWBA_t + \gamma_{12} * IIAG_t + ELF_t \gamma_{13} * + MPH_t + \gamma_{14} * SA_t + \gamma_{15} * WA_t + \varepsilon_{3_t}$ (4.6c)

Where: α_0 to α_{10} correspond to the estimated coefficients of the U5MR equation

β_0 to β_{14} correspond to the estimated coefficients of PSE equation

γ_0 to γ_{15} correspond to the estimated coefficients of CU

ε_{1_t} , ε_{2_t} and ε_{3_t} are error terms corresponding to each one of the equations

U5MR (under-five mortality rate), PSE (primary school enrolment) and CU (child underweight) are dependent variables in equations 4.6a, 4.6b and 4.6c.

PSE, CU_1 (child underweight with 1 year lag), GPI (gender parity index), FAG (female employment in agriculture), AGV (agriculture value added), HE (health expenditure), RS (rural sanitation), ELF (ethnolinguistic fractionalization), GOS (girls out of school) and WA (West Africa) are explanatory variables for under-five mortality rate (child poverty).

U5MR, CU, GPI, GOS, CPI (crop production index), PRD (paved roads), PLG (persistence to the last grade), CL (child labour), IIAG (Ibrahim's Index, African Governance), ORP (orphans), FPST (female primary school teacher), MPH (mobile phone subscribers), SA (South Africa) and WA (West Africa) are explanatory variables for primary school enrolment.

CU_1,U5MR,PSE,GPI,CPI,CPI_1 (crop production index with 1 year lag), FSV (female secondary vocational enrolment),WF (wood fuel), MA (age at first marriage),OOSC (out of school children), MWBA (married women can open a bank account), IIAG, ELF, MPH,WA and SA are explanatory variables for child health.

4.4 Data and construction of variables

This section shows the list of countries under study, defines the variables employed in empirical regressions, their expected signs and the suitability of the explanatory variables in explaining changes in the dependent variables.

4.4.1 Countries under observation

The empirical regressions on child poverty equations have been estimated with a sample of 30 countries (between1990-2010), out of the 48 sub Saharan African countries. The criteria of the choice of countries has been based entirely on the availability of data related to our interest. A sample of 30 countries, which although constrained by the availability of data, is broadly representative.

Table 4.1 Countries under observation and excluded countries

Countries under study	Excluded countries
1. Benin	1. Angola
2. Botswana	2. Cape Verde
3. Burkina Faso	3. Comoros
4.Burundi	4. Djibouti
5. Cameroon	5. Equatorial Guinea
6. Central Africa Republic	6. Eritrea
7. Chad	7. Ethiopia
8. Congo Democratic Republic	8. Guinea
9. Congo Republic Democratic	9. Liberia
10. Cote d´Ivoire	10. Namibia
11. Gabon	11. Sao Tome & Principe
12. Gambia	12. Seychelles
13. Ghana	13. Sierra Leone
14. Guinea Bissau	14. Somalia
15. Kenya	15. Sudan
16. Lesotho	16. Swaziland
17. Madagascar	17. Tanzania
18. Malawi	18 Zimbabwe
19. Mali	
20. Mauritania	
21. Mauritius	
22. Mozambique	
23. Niger	
24. Nigeria	
25. Rwanda	
26. Senegal	
27. South Africa	
28. Togo	
29. Uganda	
30. Zambia	

4.4.2 Definition of variables under study

Table 4.2 Definition of the variables under study

Under-five mortality rate is the probability that a new-born baby will die before reaching age five, if subject to current age-specific mortality rates. The probability is expressed as a rate per 1,000. Source: World Bank and United Nations Children's Fund. Under-five mortality rates have been converted into percentages.
Preschool enrolment (%) is*" the total enrolment in preschool education, regardless of age, expressed as a percentage of the total population of official preschool education age",* World Bank
Primary school enrolment (%) is *"total enrolment in primary education, regardless of age, expressed as a percentage of the population of official primary education age. Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music",* World Bank
Child underweight (weight for age % of children under 5) is "*the percentage of children under age 5 whose weight for age is more than two standard deviations below the median for the international reference population ages 0-59 months*", World Bank. Child underweight_1 is child underweight with 1 year lag.
Gross enrolment ratio, gender parity index (%**) "***Ratio of female gross enrolment ratio for primary to male gross enrolment ratio for primary school. It is calculated by dividing the female value for the indicator by the male value for the indicator. A GPI equal to 1 indicates parity between females and males. In general, a value less than 1 indicates disparity in favour of males and a value greater than 1 indicates disparity in favour of females"* World Bank
Female employment in agriculture, (% of female employment*) "employment is defined as persons of working age who were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a job, or to working-time arrangement. The agriculture sector consists of activities in agriculture, hunting, forestry and fishing",* World Bank
Agriculture, value added (% of GDP**) "***agriculture includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3"*, World Bank
Total health expenditure (%) "*Is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation*", World Bank

Rural sanitation (% of rural population with access to sanitation). Access to sanitation refers to the share of the population with at least adequate excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta. Suitable facilities range from simple but protected pit latrines to flush toilets with sewerage. To be effective, all facilities must be correctly constructed and properly maintained. World Health Organization and World Bank.
Ethnolinguistic fractionalisation (% ELF) measures the probability that two randomly selected individuals from a country are from different ethno-linguistic groups. This fractionalization is between 100 and 1. The higher the index, the more fragmented the country. Source: Posner, D.N (2004) and La Porta et al. (1999)
Out of school children (%) is*" the number of children in the official primary-age range who are not enrolled in primary",* UNESCO Institute for Statistics.
Girls out of school (%) *is "the number of girl children in the official primary age range who are not enrolled in primary*". UNESCO Institute for Statistics
Crop production index (%) (2004-2006 = 100) **"***Crop production index shows agricultural production for each year relative to the base period 2004-2006. It includes all crops except fodder crops. Regional and income group aggregates for the FAO's production indexes are calculated from the underlying values in international dollars, normalized to the base period 2004-2006*",World Bank. Crop production index_1 is the crop production index with 1 year lag.
Persistence to last grade of primary (% of cohort) is "*the percentage of children enrolled in the first grade of primary school who eventually reach the last grade of primary education",* World Bank
Ratio of female to male labour force participation rate(%) is the ratio of female to male of proportion of a country's working-age population (ages 15 and older) that engages in the labour market, either by working or actively looking for work, expressed as a percentage of the working-age population. World Bank.
Children in employment (%) refers to the total percentage of children ages 7-14 involved in economic activity for at least one hour in the reference week of the survey. Study and work refer to children attending school in combination with economic activity. World Bank.
The Ibrahim Index of African Governance (%IIAG) "*of Mo Ibrahim Foundation covers 48 sub-Saharan African nations and is captured by 5 categories, 14 sub categories and 57 sub-sub-categories of 'political goods' provided by the government to the citizens. The major 5 categories are: Safety and Security, Rule of Law, Transparency and Corruption, Participation and Human Rights, Sustainable Economic Opportunity, Human Development. The indices are said to capture outcome not the input. Unlike the existing indicators which heavily depend on perception and processes, Ibrahim index is argued to rely on objective standard. This indicator is concerned more about the performance and achievements rather on intention or promise of the government. Each country receives a score of 0-100 with the highest score showing the best performance*", source- Economic Commission for Africa (ECA). We have chosen IIAG as our measure of the quality of African institutions, because its definition of governance is in line with the present study's objectives of child poverty. IIAG's definition of governance as the provision of the political, social and economic goods that any citizen has the right to expect from his or her state and that any state has the responsibility to deliver to its citizens.
Female teachers in primary school (%) is the number of female teachers at the primary level expressed as a percentage of the total number of teachers (male and female) at the primary level in a given school year. Teachers are persons employed full time or part time in an official capacity to guide and direct the learning experience of pupils and students, irrespective of their qualifications or the delivery mechanism, i.e. face-to-face and/or at a distance. This definition excludes educational personnel who have no active teaching duties (e.g. headmasters, headmistresses or principals who do not teach). Source: World Bank
Mobile cellular subscriptions % **"***Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, tele point, radio paging and telemetry services*", World Bank
Enrolment in secondary vocational, female (%) is the percentage number of girls enrolled in vocational programmes at public and private secondary education institutions. Vocational education is designed for learners to acquire the knowledge, skills and competencies specific to a particular occupation or trade or class of occupations or trades. Vocational education may have work-based components (e.g. apprenticeships). Successful completion of such programmes leads to labor-market relevant vocational qualifications acknowledged as occupationally-oriented by the relevant national authorities and/or the labor market. World Bank and UNESCO
"*Roads, paved % of total roads. Paved roads are those surfaced with crushed stone (macadam) and hydrocarbon binder or bituminized agents with concrete or with cobblestone as a percentage of country roads, measured in length*". Source World Bank.

Wood fuel production quantity (CUM, solid volume units*) "refers to all round wood used as fuel for purposes such as cooking, heating, or power production. It includes wood harvested from main stems, branches and other parts of trees. It also includes wood intended for charcoal production"*. Source-World Bank- Wood fuel was converted into % by author by dividing data on wood fuel by the population of 0-14 years and then the result of each respective country is averaged by the time period under study and then a sum total of all the averages of respective countries was done. Then country averages were divided by the sum total of all the averages and then multiplied by a hundred to create wood fuel per capita. Country averages' division with the sum total, when all added they amounted to one, while when multiplied by a hundred their sum total was a hundred.
Child marriage (%) is *"the formal marriage or informal union of a child, defined as under age 18, either with an adult or another child. It happens to both girls and boys, although girls are affected more often. Globally, it is more prevalent in rural than urban areas*", United Nations Children's Fund (UNICEF).
Married women can open a bank account is a dummy variable of those married women who can have their own bank accounts. World Bank.
Women giving birth by age 15 "*Percentage of women 15-19 who are mothers or pregnant with their first child by selected background characteristics*" DHS
Birth interval is "*percent distribution of non-first births in the five years preceding the survey by number of months since previous birth, according to selected background characteristics*" DHS
Birth order is "*percentage distribution of births in the 2 years preceding the survey according to birth order by background characteristics*" DHS
% thin women BMI (<18.5) is "*Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2)".* BMI <18.5 implies the women are underweight. Source DHS.
Skilled antenatal care is *"percentage of women with a live birth in the five (three) years preceding the survey who received antenatal care for the most recent birth, by content of antenatal care". DHS*
Skilled birth attendant is "*percent distribution of live births in the last five (three) years preceding the survey, by type of assistance during delivery, according to selected background characteristics*". Birth attendants refer to the percentages of deliveries attended by personnel trained to give the necessary supervision, care, advice during pregnancy, labor and the postpartum period on how to take care of the new-borns. DHS
DPT_3 Vaccination is "*percentage of children one to four years of age, for whom a vaccination card was shown to the interviewer and the percentage vaccinated for BCG, DPT, polio and measles during the first year of life, according to current age of the child*". DHS
School attendance and reasons for leaving school (e.g did not like school, got married, did not pass exams, school not accessible, family needed help and could not pay school fees) "*percent of the de-facto household population 6-15 years of age whether attending school and reasons for leaving school by age group, sex, urban-rural residence, and region". DHS*
Orphans school attendance definition by DHS for 5year period "percent distribution of de-jure children 10-14 years whose parents are dead. DHS. Orphans definition by World Bank for the whole period: Orphan (%) children 0-17 years currently living whose parents are dead, source World Bank.
Rural women with sec. or higher education *"percent distribution of rural women age 15-49 by highest level of education attended. DHS*
Rural women who are literate "*percent distribution of rural women aged 15-49 by level of schooling attended and by level of literacy, and percent literate, according to background characteristics*". DHS
Women's participation in decision making by background characteristics*, "percentage of women who say that they alone or jointly have the final say in specific decisions, by background characteristics" DHS*
Wife earns less than husband is the percent of married women whose wage rate level is less than their husband's, DHS
Unprotected well water is " *% share of the population without access to an adequate amount of safe water (including treated surface water and untreated but uncontaminated water, such as from springs, sanitary wells, and protected boreholes). An adequate amount of water is that needed to satisfy metabolic, hygienic, and domestic requirements, usually about 20 litres of safe water a person per day*". DHS.
Children with birth certificates %: "*is defined as the official record of a child's birth by the administration of the State. It establishes a child's legal identity"*. UNICEF
Breastfeeding and complementary foods %: percent of infants aged 6- 24 months who are given breastmilk and complementary foods (solid or semi-solid foods). DHS.
Lowest wealth quintile %: Income share held by lowest 20%. Source DHS
Women who own land, house: Percentage of women age 15-49 who own land, house or both. Source DHS. A woman might not own land but has access to land which is the right to enter upon and use land. Might have access to land but not control over land. Control over land is one's ability to take decisions with regard to the control of land such as to determine the size of land used for farming activities, whether the land will be used for food or cash crops production and the ability to transfer land titles, whether by sale or inheritance (land ownership).

Women with access to credit: Percent of women aged 15-49 with access to credit. Source DHS.

It is evident that the source of most of the data is the World Bank's African Development Indicators 2012. Other sources have been United Nations Educational Scientific and Cultural Organisations database (UNESCO) 2011, Economic Commission for Africa (ECA) 2011, United Nations Children's Fund (UNICEF) 2011, Demographic Health Surveys (DHS). These organisations have used household survey methods to collect the data.

4.4.3 Analysis of the expected sign of the variables

This section analyses the expected signs of the defined variables in section 4.4.2, the signs are provided to facilitate the interpretation of the estimated equations.

Table 4.3 Analysis of the table with the expected sign

EQUATION 1: UNDERFIVE MORTALITY RATE.	
Primary school enrolment	negative
Child underweight	positive
Gender parity index	negative/positive
Female employment in agriculture	negative
Agricultural value added	negative
Health expenditure per capita	negative/positive
Rural sanitation	negative/positive
Ethnolinguistic fractionalization	negative/positive
Girls out of school	positive
EQUATION 2: PRIMARY SCHOOL ENROLMENT	
Under five mortality	negative
Child underweight	negative
Gender parity index	positive/negative
Crop production index	positive
Paved roads	positive
Persistence to the last grade of primary	positive
Ratio of female to male labour F.P.R.	positive/negative
Children in employment	negative
Girls out of school	negative
Ibrahim index African governance	positive/negative
Orphans 0-17yrs currently living	negative
Female teacher primary school	positive
Mobile phone subscribers	positive/negative
EQUATION 3: CHILD UNDERWEIGHT	
Child underweight_1	positive
Under -five mortality rate	positive
Primary school enrolment	negative
Gender parity index	positive/negative
Crop production index	positive
Crop production index_1	negative
Female enrolment secondary Vocational	negative
Wood fuel	positive
Child marriage	positive
Out of school children	positive
Married women open bank acc.	negative
Ibrahim index African governance	negative/positive
Ethnolinguistic fractionalization	negative/positive
Mobile phone subscribers	negative/positive

OOSC has a positive effect on both U5MR and underweight children because children who have been deprived of education end up being an unskilled workforce which limits their labour market options and they are more likely to find low paying jobs, which will consequently exacerbate intergenerational poverty status. Children born to young mothers face a higher risk of morbidity and mortality than children born to adult mothers. Young mothers (age at marriage) may lack the right information on how to take care of their babies as well as the

means to access health facilities and healthy food, these deficiencies can considerably increase underweight children and U5MR. The prevalence of underweight causes child deaths largely associated with diarrhoea which kills more children than any other deadly disease**.** The majority of orphans have poor living conditions and are mostly deprived of healthcare and education and end up as unskilled adults which leads to increased child poverty and decreased access to education in the long run. Availability of good rural sanitation reduces U5MR, while the absence of good sanitation breeds epidemics that are life threatening. The role of rural sanitation in reducing U5MR depends on women's education and knowledge of hygienic practices which help to keep away waterborne diseases that are an outcome of a lack of water and sanitation. A high ratio of girls to boys at primary school (gender parity index) has a negative effect on U5MR, through the benefits of female education, while a low ratio of girls to boys leads to an increase in U5MR.

Ethno-linguistic fractionalisation (ELF) can have a positive or negative impact on U5MR, depending on its influence on policy making decisions, thereby affecting the quality of institutions. Several studies including one by Mauro (1995) have reported that fractured societies (ELF) largely contribute to lower rates of growth. However ethnic associations which are founded with the objectives of improving the wellbeing of their members have a negative effect on U5MR and indirectly improve rural economies. These associations normally generate social capital through channels such as the extent of trust among the members, social networks and a sense of identity. On the other hand, as is common in Africa, fractured societies are mostly in conflict, and hardly ever agree on developmental issues. In most cases, the minority have the smallest share of the national pie. Discontentment culminates with everyday conflicts, which in the process diverts resources in the form of time, manpower and material from productive use to wastage in conflicts.

Total health expenditure on primary healthcare (such as birth attendants' services) which assist expectant mothers with healthcare and childcare information from the time of conception through to the time of delivery of babies has a negative impact on U5MR. While health expenditure on tertiary healthcare which does not benefit poor people has a positive effect on U5MR. However, birth attendants' services are available through public provision and depend on mother's ability to access them (women's status). Distribution of public expenditure resources in any sector depends on the capacity and quality of institutions. Poor policy choices that divert resources from reaching services that are mostly utilised by poor families end up increasing poverty levels, and thus institutions can either have a positive or negative impact on child poverty. Gender inequality in labour force participation rate, denies women the option of participating in the labour market and thereby may subsequently indirectly increase child poverty levels through women's lack of access to labour market.

4.4.4 Summary of descriptive statistics

This subsection presents a summary of the descriptive statistics.

Table 4.4 Descriptive statistics of factors affecting child poverty in Sub Saharan Africa

Variable	Units of measurement	Mean	Standard deviation	Minimum	Maximum	Abbreviation
Under five mortality rate	% proportion of live births	13.48	5.1	1.51	30.79	U5MR
Gender parity index	%	84.45	16.04	40.93	124.21	GPI
Out of school children	%	31.37	18.51	1.17	81.00	OOSC
Female employment in agri.	% propo.fe. empl. Agr.	60.75	23.03	4.14	96.65	FAG
Mobile phone subscribers	%	33.34	32.49	0.00	100.00	MPH
Rural sanitation	% of rural population	25.00	21.24	0.00	88.00	RS
Primary school enrolment	%	68.84	18.34	22.28	98.83	PSE
Ibrahim Index African Gover.	%	50.66	12.23	24.24	81.57	IAG
Female primary Sch. Teacher	% of total teachers	38.69	19.02	5.89	81.85	FPST
Orphans 0-17yrs currently living	%	1.87	3.76	0.01	25.00	ORP
Ratio female to male labour F.P.R	Pop. Ages +15 in %	80.14	18.39	10.23	108.08	RFM
Underweight children	%	23.70	8.62	3.30	49.60	CU
Crop production index	%	9.01	2.18	0.60	18.05	CPI
Wood fuel	%	11.27	15.61	0.01	76.60	WF
Child labour	%	15.66	16.96	0.59	93.82	CL
Health expenditure per capita	% of GDP	5.51	2.95	2.09	11.8	HE
Ethno linguistic fractionalisation	% total population	64.84	24.39	4.00	90.00	ELF
Girls out of school	%	4.53	8.15	2.09	54.88	GOS
Persistence to the last grade pri.	Total % of cohort	55.03	18.95	16.16	98.45	PLG
Married women open bank acc.	Dummy	0.73	0.44	0.00	1.00	MWBA
Paved Roads	% of total roads	22.01	22.37	1.00	100.00	PRD
Female enrol sec. vocational	%	38.35	11.04	8.65	86.22	FSV
Agricultural value added	% of GDP	4.52	12.66	-33.07	59.75	AGV
Regional dummy Eastern Africa	Dummy	0.30	0.46	0.00	1.00	EA
Regional dummy Southern Africa	Dummy	0.09	0.30	0.00	1.00	SA
Regional dummy Western Africa	Dummy	0.40	0.49	0.00	1.00	WA
Child marriage	% of total	21.16	2.33	17.60	28.00	CM

Descriptive results in Table 4.4 reveal a widespread disparity in explanatory variables of children's health and education status across Sub Saharan African countries that are worthy noting. Niger has the highest U5MR of 30.79%, and has child mortality rates that are about 20 times higher than Mauritius, which has the lowest U5MR of 1.51%. The U5MR in Niger is more than double the average U5MR of 13.48. Table 4.4 shows a very wide disparity between the maximum value for OOSC (81%) and the lowest 1.17%. Between 1990 and 2010, summary statistics indicate a wide disparity in enrolment rates across Africa. Niger had the lowest primary school enrolment of 22.28%, while Mauritius had the highest 99%. Niger's primary school enrolment rate was approximately one-fifth that of Mauritius, and the former is about one-third of the mean primary school enrolment rate of 68.84%. The range of total health expenditure as a proportion of GDP was from 2.09% to 11.8% with a mean of 5.5%. A large majority of Sub Saharan African countries spend little more than 6% of their GDP on health.

5. Descriptive analysis of potential factors affecting child poverty

"Women of Africa toil all their lives on land they do not own, to produce what they do not control and at the end of their marriage through divorce or death they can be sent away empty-handed". Mwalimu Julius Nyerere, former President of Tanzania.

Chapter 5 starts off by identifying children in poverty; the procedure of identification is explained with the aid of operationalised child poverty measure (child's perspective deprivation approach) to measure child deprivation indicators. After identifying children in poverty, the question arises — which are the most important variables affecting child poverty? Due to multiple interdependencies among child poverty variables, principal component analysis (PCA), a dimension reduction technique, has been used to investigate the pattern of correlations and to remove redundant variables and variables that have not been loaded heavily on any of the chosen components and retain only the important variables. We identify and weight the most important variables affecting child poverty with data for maximum five years, data for one year and then data for the whole period 1990-2010. The reason for using data for five years and data for one year alongside data for the whole period is because some data are missing for some of the years in the period 1990 – 2010 for variables in the conceptual framework representing the low status of women and education in explaining child poverty, therefore results for such variables are reported in this chapter. Based on this understanding this chapter complements Chapter 6 by measuring the important variables with missing data, and it does this by using data from DHS (This survey collects and disseminates nationally representative household surveys data on health, population and nutrition in developing countries) from the latest years of the respective countries under study to present a descriptive analysis.

Identify country clusters of African countries based on their factor scores in the most important variables affecting child poverty. Countries under study have been clustered into smaller subgroups that are more manageable and easier to interpret than individual countries. We use pre-treated data of five-year period factor scores of African countries in factors affecting child poverty generated by PCA to cluster countries using agglomerative hierarchical clustering. We have also clustered countries based on quartiles which are calculated for each country by weighting country factor scores by the coefficient of the first principal component. Results are reported firstly by country clusters in general based on country similarity and dissimilarity in factor scores of African countries in the most important variables affecting child poverty. Secondly by country clusters using country quartiles of percentage averages of factors affecting child poverty, and finally by country quartiles of individual country averages of factor scores of factors affecting child poverty. Lastly, from the numerous important variables identified by PCA, a section is dedicated to a few variables to elaborate further on education and the low status of women.

5.1 Identification of children in poverty

In the quest to identify children in poverty, we address questions such as how to measure a child's welfare. Do we assess the situation of children by looking at the income of the household that they live in and if so, what do we consider to be a threshold below which we consider the children to be poor? (Monetary approach)

Alternatively, do we look beyond monetary resources and include issues like education, health, nutrition? (Deprivation approach). These questions imply decisions on the unit of analysis as well as the specific issues deemed relevant to capturing children's wellbeing. These decisions are not only based on theoretical arguments or specific judgements but they also involve a degree of value judgement (Corak 2005). With respect to the unit of analysis, one needs to choose whether to analyse the child as a member of a household or as an individual unit. Incorporating the child as a main unit of analysis ensures that the approach is child-focused and measures the situation as it represents itself to children. Considering children to be members of a household takes the analysis back to the household level and forces one to rely on assumptions for the assessment of poverty at the child level. Data needs increase when the child poverty approach becomes more child focused and incorporates more child specific aspects. However, it should be noted that there are constraints of data availability on child specifics.

If questions about unit of analysis arise, should we use the household as the proper unit of analysis since children's basic needs are mostly provided by the household and equivalence scales provide a proper tool for considering intra-household distribution? The present study has used both child specific and household units where applicable because child specific information is less available than household level information. We attempt to measure those aspects of children's lives that are deemed capable of identifying whether a child is poor or not. Normally the measurement ranges from a unit-dimensional to a multidimensional measure. The unit-dimensional approach bases its identification solely on the aspect of income or one other dimension. For the present study, a multidimensional approach has been opted for, because in addition to monetary aspects, families and individuals are affected by many other aspects. Income based measures do not capture the non-monetary aspects of child poverty (Waddington 2004).

5.1.1 Child poverty measured using a child's perspective deprivation approach

A poverty measure is a summary statistic on the economic welfare of the poor in a society. There is no universally accepted single measure of poverty. In terms of poverty incidence, child poverty is the fraction of children in households falling below the poverty line as a percentage of all children (Ravallion 1994). The monetary approach measures child poverty by using national basic needs poverty lines which are expressed as percentages of the population living below the national poverty line. However, the deprivation approach establishes a set of basic services and capabilities and then measures the number of children who do not have access to the basket of services and capabilities. Cornia and Danziger (1997), White et al. (2003), and UNICEF (2008) have endorsed the deprivation approach that captures multiple dimensions of child poverty as one of the non-monetary measures of child poverty.

The deprivation approach used by Gordon et al. (2003b) identifies water, sanitation, food, shelter, health, education and information as the basic needs of children (humans). The identification and aggregation methods of the deprivation approach require that information on all dimensions is available for each individual child. Thus, one has to rely on a single survey as a data source, unless the same sample with the same children is

used for other surveys, enabling information to be combined (Gordon et al. 2003b). The present study does not have access to the same children all through the sample, but the percentage of underweight children for example, immunized, enrolled in primary school does not fulfil the same child requirement.

The concepts of poverty and deprivation are tightly linked but there is general agreement that the concept of deprivation covers the various conditions independent of income experienced by people who are poor, while the concept of poverty refers to the lack of resources which makes those conditions inescapable or at least highly unlikely to escape (Townsend 1987). Our measurement of child poverty is hinged on the present study's definition of child poverty and at the same time we partly follow Gordon et al. (2003b) in their estimation of the number of children living in poverty in developing countries. Their approach is a variant of the basic needs approach to poverty measurement, where households and the children therein are considered to be living in poverty depending on insufficient access to each of the seven elements representing the various rights of children. Our child poverty measurements go a step further than Gordon et al. (2003b) by incorporating other child deprivation indicators – birth registration, U5MR, child labour, not just education in general but a special focus on OOSC, women's low status, the role of institutions and other conventional variables to explain child poverty. Figure 5.1, presents a line chart that identifies children in poverty as those deprived of needs basic to human development.

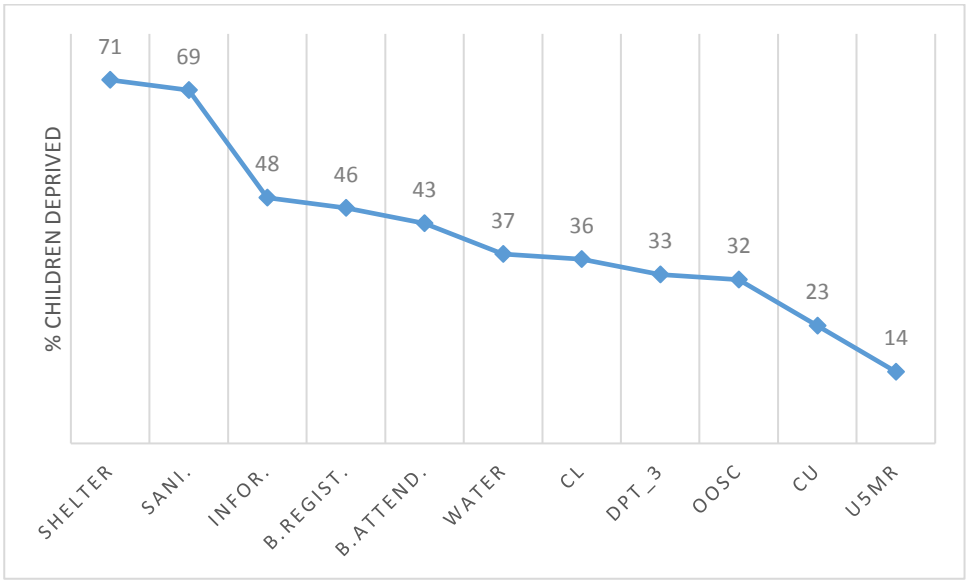

Figure 5.1 % averages of children deprived of basic capabilities and services in Africa 1990-2010
Data Source: World Bank-African Development Indicators (2012). Note: Sani-sanitation, infor-information, B.regist-birth registration, CL-child labour, OOSC-out of school children, CU-child underweight and U5MR-under-five mortality rate

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Figure 5.1 depicts percentages of averages of ten child deprivation indicators across 30 Sub Saharan African countries. Data on slums has been used as a proxy for shelter. The United Nations Human Settlements Programme (UN-habitant 2009) defines slums as an urban area lacking in basic services such as sanitation, potable water, electricity; substandard housing, overcrowding, unhealthy and hazardous locations, insecure tenure and social exclusion. Figure 5.1 indicates shelter as the greatest deprivation, 71% of Sub Saharan

African children suffer from being deprived of good shelter. Lack of sufficient data on shelter in Africa has led to the use of slums to explain shelter deprivation. Slums are common in urban areas and yet the majority of the African population are in rural areas, thus slums are not a particularly representative measure of shelter. For this reason, we have used wood fuel as a proxy for shelter in Chapter 6.

Basic sanitation indicates the percentage of the population with access to an adequate sanitary facility for human excreta disposal in the dwelling or immediate vicinity. Accessibility to adequate excreta disposal facilities is fundamental to decreasing the faecal risk and the frequency of associated diseases. Its association with general hygiene and quality of life makes it a good universal indicator of human development. Approximately 69% of Sub Saharan African population suffers from inadequate sanitation. Sanitation and shelter are highly correlated; families deprived of shelter are also likely to be deprived of sanitation, thus although slums are not good representatives of shelter, the results on sanitation points to the severe shelter deprivation experienced by African children. Our findings are in line with those of Gordon et al. (2003b) who found shelter and sanitation to be the biggest problems faced by children in the developing world. Mauritius has the lowest proportion of families deprived of sanitation (11%) while Niger has the highest (93%).

Skilled birth attendant deprivation exposes a large percentage of the population of new-borns and their mothers to health risks. Mauritius (2%), has the lowest percentage of children not receiving skilled birth attendants, while Chad, Nigeria, Niger, Burundi, Guinea Bissau, Kenya, Mali, Mozambique, Uganda and Zambia have more than 50% of their children deprived of birth attendants.

Education deprivation is represented by the percentage of primary school going age children who are out of school (OOSC). We have excluded preschool children, because their percentages are extremely high and their inclusion would distort the proportions of out-of-school (primary) children. An average of 32% of Sub Saharan African children are deprived of education. But this average percentage conceals the disparities of high percentages across the region, with Niger (64%) having the highest number of OOSC, whereas countries like Malawi, Mauritius, Uganda, Gabon and South Africa have proportions of 10% or less.

Child underweight is the percentage of children under five years of age whose weight for age is more than two standard deviations below the median for international reference population ages 0-59 months. Between 1990 and 2010, 23% of African children were underweight. Niger has the highest percentage of underweight children (42%), South Africa has the lowest (9%). Between 1990 and 2010, the U5MR in Africa was 14%.

5.2 Results of principal component analysis (PCA) for factors affecting child poverty

The results shown in Figure 5.1 have identified the percentages of children deprived of basic needs. We now turn to the question – which are the most important variables affecting child poverty? The most important variables are identified with the application of PCA statistical method that was explained in Chapter 4. This section reports the findings, starting with Table 5.1 on eigenvalues that indicates the percentage of variances

of different components and the percentage of their cumulative variance to the total variance. This is followed by a table on retained components and the variables that have been loaded on them and what the respective variables have in common.

5.2.1 Principal component analysis (PCA) for factors affecting child poverty over five-year period

Table 5.1 Eigenvalues of factors affecting child poverty over five-year period

	Eigenvalue	Variability (%)	Cumulative (%)
F1	7.453	26.618	26.618
F2	3.378	12.065	38.683
F3	2.413	8.617	47.300
F4	2.024	7.230	54.530
F5	1.665	5.948	60.478
F6	1.410	5.037	65.514
F7	1.304	4.657	70.171
F8	1.157	4.130	74.302
F9	0.891	3.183	77.484
F10	0.851	3.039	80.523
F11	0.703	2.511	83.034
F12	0.640	2.284	85.318
F13	0.527	1.882	87.200
F14	0.511	1.824	89.024
F15	0.480	1.715	90.739
F16	0.404	1.443	92.182
F17	0.369	1.319	93.501
F18	0.294	1.052	94.553
F19	0.268	0.956	95.509
F20	0.246	0.878	96.387
F21	0.213	0.761	97.149
F22	0.193	0.690	97.838
F23	0.170	0.607	98.446
F24	0.126	0.450	98.895
F25	0.101	0.362	99.257
F26	0.087	0.312	99.569
F27	0.072	0.258	99.827
F28	0.049	0.173	100.000

Out of the 28 components in Table 5.1, only the first 8 displayed eigenvalues greater than one: F1 has the highest eigenvalue of 7.453, the eigenvalues of successive factors reduce until the last factor (F28) whose eigenvalue is 0.049. As already pointed out, all the variables in the dataset have been standardized to a mean of zero and a variance of one, so the sum of the eigenvalues from F1-F28 is 28. F1 has the highest variance from the original variables (26.618%), while F28 has the least variance of 0.173%. The cumulative column indicates that F1 and F2 show 38.68% of the variance. The cumulative pattern implies that each additional factor adds a smaller and smaller amount to the variance, however the total accumulation of all the 28 factors amounts to 100%. Based on the information (please refer to chapter 4, subsection 4.4.1) about the criteria for choosing the principal components to retain, we have chosen principal components F1–F7 that account for 70-80% of cumulative variance (Zwick and Velicer1986).

TABLE 5.2 RESULTS OF PRINCIPAL COMPONENT ANALYSIS OF FACTORS AFFECTING CHILD POVERTY 5YEAR PERIOD

	(1) Teenage mothers, nutrition & orp.sch.	(2) Women's status	(3) Institutional quality & child wellbeing	(4) Women's education & shelter	(5) Care for women & children	(6) Assets & child participation	(7) Gender parity index & health
Women giving birth by age 15	**0.65**	-0.22	-0.13	-0.14	0.38	-0.15	-0.36
Breastfeeding & complement. foods	**0.72**	0.07	0.10	0.09	-0.12	0.10	-0.01
School attend. orphans aged 10-14	**0.51**	0.09	0.27	0.23	-0.29	-0.21	0.55
Women final say in social networking	0.02	**0.68**	0.23	0.17	-0.39	0	0.24
Wife earns less than husband	-0.04	**-0.78**	-0.18	-0.18	0.38	0.16	0.01
Women in agriculture	-0.05	**0.72**	-0.04	-0.33	0.07	0.10	0.27
Couple joint de- use of wife's earnings	-0.05	**0.80**	0.08	0.21	-0.26	-0.23	0.28
Households with a mobile telephone	-0.12	**-0.61**	0.06	0.34	-0.11	0.07	0.36
Ibrahim Index African Governance	-0.40	-0.14	**0.66**	0.05	-0.22	0.19	0.23
Primary school enrolment	0.07	0.18	**0.75**	0.10	0.22	-0.03	0.02
Out of school children	-0.23	-0.12	**-0.78**	0.25	0.17	0.08	-0.26
Under-five mortality rate	0.11	-0.28	**-0.66**	-0.32	0.20	-0.05	-0.15
Child underweight	-0.39	0.09	**-0.58**	-0.03	-0.08	-0.35	-0.27
Thin women BMI (<18.5)	-0.14	0.27	**-0.44**	0.20	0.42	0.08	-0.43
Women with sec. or higher education	0.03	0.04	0.06	**0.77**	0.09	0.11	0.15
Women who are literate	0.10	0.03	-0.11	**0.76**	-0.27	-0.25	-0.02
Cooking with wood	0.06	0.20	-0.34	**-0.55**	0.19	-0.31	-0.25
Birth interval 24-35 months	0.11	-0.15	0.09	-0.13	**0.80**	-0.06	0.05
Birth order 5+	0.20	-0.32	0.07	-0.11	**0.72**	0.08	-0.22
Skilled antenatal care	0.03	0.20	0.31	0.05	**-0.56**	0.09	0.28
Skilled birth attendant	0.25	-0.04	0.09	-0.01	**-0.65**	0.10	0.09
Households with a radio	-0.21	-0.21	0.34	0.05	-0.21	**0.53**	0.14
Children with a birth certificate	0.04	-0.14	-0.13	-0.03	-0.05	**0.89**	-0.16
Lowest wealth quintile	0.11	0.12	0.14	0.05	0.03	**0.50**	0.39
Gender parity index	-0.18	0.30	0.23	0.05	0.07	-0.12	**0.56**
DPT_3 vaccination	-0.37	0.22	0.29	0.05	-0.30	0.09	**0.61**
Unprotected well water	0.04	-0.25	-0.10	-0.35	0.33	-0.16	**-0.69**
No toilet facility	-0.03	0.03	-0.13	-0.05	0.10	-0.08	**-0.85**

Table 5.2 depicts the seven retained components. The choice of variables to load on each component was guided by the third criterion, and we set up 0.40 as our cut-off minimum point. The variables in Table 5.2 mostly meet the third criterion with the exception of thin women BMI (<18.5) which has its highest loading on component 3, but has cross-loading over 0.40 under for both components 5 and 7. The same case applies to school attendance of orphans which cross loads on both components 1 and 7. Cross loading is common but undesirable, in the sense that one prefers to have only one factor to predict each item (Brown 2009).

The seven principal components in Table 5.2 are labelled by names which more or less depict what the variables that have loaded them have in common. For instance, women who give birth by age 15 are either child brides, or could not continue schooling after getting pregnant because few African countries have made

provision for teenage mothers to continue with their education, thus at times they are constrained to enter into a child marriage. Teenage mothers in Africa are generally without the right information on how to combine breastfeeding and complementary foods. At the same time, they are largely characterized with poor health and tend to be victims of maternal mortality rates and thus some children are orphans because they had teenage mothers and therefore the variable of school attendance orphans is correlated with women giving birth by age 15. Due to the correlations of women giving birth by age 15, breastfeeding and complementary foods; and school attendance of orphans, the first component has been named teenage mothers, nutrition and orphans school attendance: apparently, child marriage issues account for the highest percentage (27%) of the variance in factors affecting child poverty.

The second component has been named women's status because it is loaded heavily by factors common to the low status of women such as women's final say in networking, wife earns less than husband, women in agriculture, couple's joint decision on the use of wife's earnings and households with mobile phones. When women earn less than their husbands, this contributes to their lack of participation in decision making in areas such as social networking and how their earnings should be used. Households without a mobile telephone negatively affects women's employment in agriculture because they are unable to access essential information which are transmitted to farmers through text messages. The component of women's status accounts for 12% of the variation in factors affecting child poverty, and the combination of child marriage and women's status account for 39% of the variation of factors affecting child poverty.

The third component measures the Ibrahim Index African Governance (IIAG), primary school enrolment (PSE), out of school children (OOSC), under five mortality rate (U5MR), child underweight (CU) and thin women BMI (<18.5). All the variables that have been loaded on this component are both correlated to institutional quality and describe child wellbeing. Therefore component 3 is labelled institutional quality and child wellbeing: an increase in IIAG will subsequently increase percentages of PSE and reduce percentages of OOSC, U5MR, CU and malnourished women. Thin women BMI (<18.5) are positively correlated to U5MR and CU. OOSC has the highest correlation with the third component, and this component accounts for 9% of the variation in the dataset. The fourth component labelled women's education and shelter is loaded by women with secondary or higher education, women who are literate and cooking with wood. Educated women are well informed about the consequences of cooking with wood in a congested room and at the same time have more options to seek alternative cooking fuels and thus reduce cooking with wood.

The fifth component, labelled care for women and children, has been loaded by birth interval 24-35 months, birth order 5+, skilled antenatal care and skilled birth attendant. Women without access to the services of skilled antenatal care and a skilled birth attendant lack information on the benefits of family planning and thus tend to have larger families (birth order 5+). Birth interval 24-35 months has the highest correlation with component 5.

The sixth component, labelled assets and participation, is loaded heavily by households with a radio, children with a birth certificate and the lowest wealth quintile. The majority of houses from the lowest wealth quintile tend to have radio as an asset and since birth registration is free, they register the births of their children. Radios are positively correlated with children with birth certificates for children get information that enables them to participate in matters that concern their wellbeing.

The seventh component, labelled gender parity index (GPI) and health, measures the impact of no toilet facility, unprotected well water, DPT_3 vaccination and GPI. High levels of GPI which connotes high status of women enables them to access health facilities and thus increases the percentages of children who are vaccinated and reduces households using unprotected well water and without a toilet facility. The cumulative variance right from the first component to the seventh component accounts for 70% of the total variance.

In general, it is assumed that two components explain a sufficient amount of the variance to provide a meaningful visual representation of the structure of the observations and variables. Based on this assumption Figure 5.2 represents the variation in the original data accounted for by the first two principal components. Each vector represents a coefficient of a variable on the principal component, vectors pointing away from the origin represent the original variables. The angle between the vectors is an approximation of the correlation between the variables: a small angle indicates that the variables are positively correlated, an angle of 90 degrees indicates that the variables are not correlated, an angle close to 180 degrees indicates that the variables are negatively correlated. The length of the line and how close it is to the circle indicates how well the variable is represented in the plot, a line away from the circle is poor representation (Gower et al. 2010; Salina et al. 2013).

Figure 5.2 depicts that CU, cooking with wood, malnourished women (women BMI<18.5), no toilet, OOSC, unsafe water and teenage mothers are all positively correlated and have the same positive impact of increasing child poverty. Wife earns less than husband, couple's joint decision on the use of wife's earnings and female social network are much closer to the circle which implies they are well represented, whereas breastfeeding and complementary foods; women's higher education, primary school enrolment, women's literacy, birth attendant and low wealth quintile are far from the circle which connotes poor representation. The variables of the estimated coefficients on the left side of Figure 5.2 are negatively correlated to the variables of estimated coefficients on the right-hand side of Figure 5.2. By construction, the first principal component (PCA 1) on the horizontal axis accounts for the highest variance (26.62%) in the dataset followed by the second principal component (PCA 2) on the vertical axis which accounts for 12.07% of the variance**.** The coefficient of breastfeeding and complementary foods is highly correlated to the first principal component, while a couple's joint decision on the use of wife's earnings is highly correlated to the second component (the two coefficients have the highest percentages of loading in table 5.2).

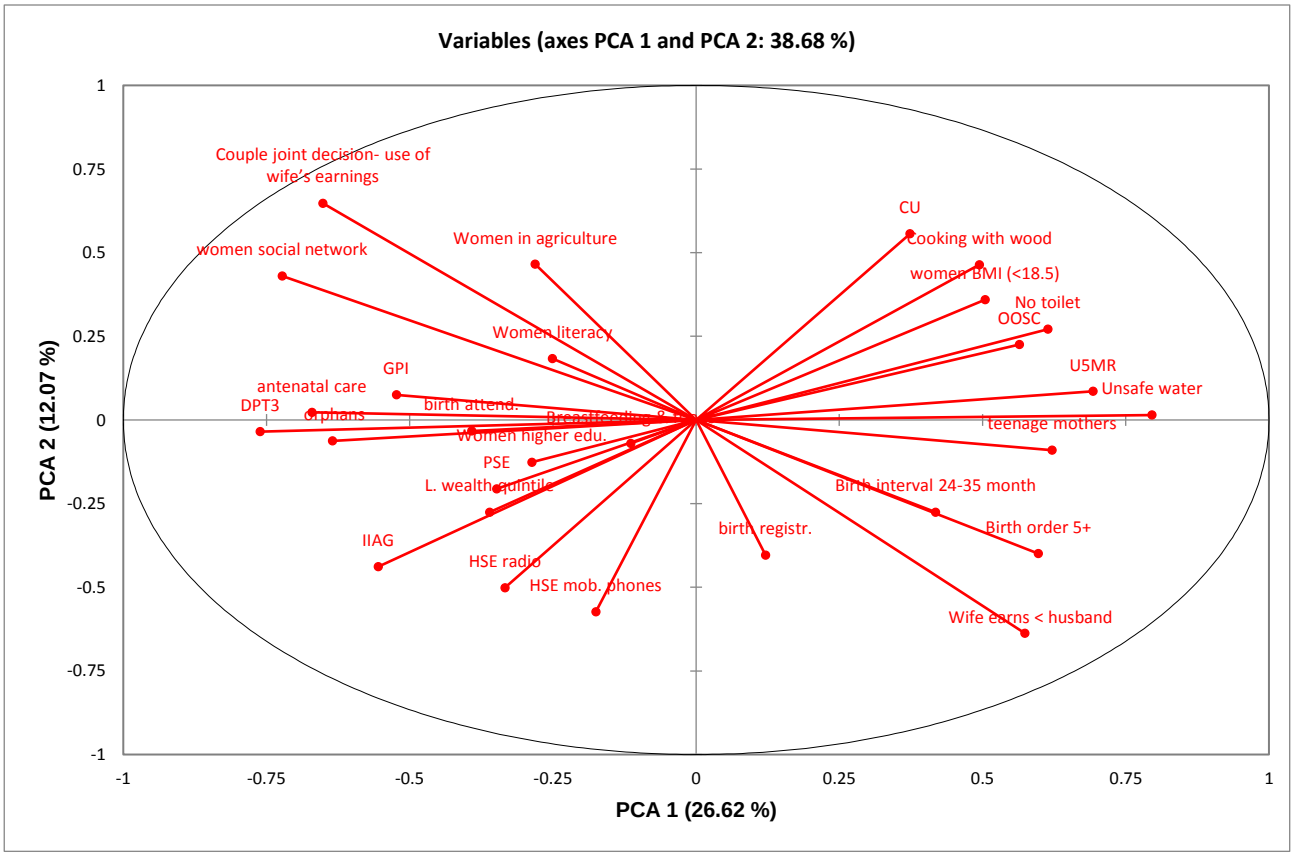


Figure 5.2 Correlations of the estimated coefficients of the variables in the principal components

5.2.2 Principal component analysis on factors affecting child poverty over a one year period

This study's research question largely focuses on the lack of access to education and the low status of rural women as factors contributing to child poverty. The foregoing PCA has investigated factors affecting child poverty associated with the low status of women and education, however some key factors (for example some of the reasons why children are either not enrolled in school or dropped out; and women's lack of access to land and credit with the occupation of rural women being largely agricultural, access to land and control, as well as access to credit is crucial to their wellbeing and that of their families) have not been investigated because our data from DHS on these issues covers about 16 countries out of the 30 countries under observation and also the data are for only a one year period. For these reasons, we could not add the variables in question to the foregoing PCA and therefore this subsection is dedicated to the investigation of these variables.

Table 5.3 Eigenvalue of factors affecting child poverty over a one year sample

	Eigenvalue	Variability (%)	Cumulative %
F1	4.325	33.266	33.266
F2	2.334	17.956	51.222
F3	2.099	16.147	67.369
F4	1.430	11.002	78.372
F5	1.119	8.610	86.982
F6	0.497	3.827	90.808
F7	0.345	2.654	93.463
F8	0.268	2.065	95.528
F9	0.195	1.499	97.026
F10	0.168	1.292	98.318
F11	0.140	1.073	99.391
F12	0.059	0.452	99.843
F13	0.020	0.157	100.000

The eigenvalues of the first four components in Table 5.3 fulfil the criterion of the eigenvalue being above one and accounting for at least 70% of the total variance in the dataset. Table 5.4 presents these components.

Table 5.4 RESULTS OF PRINCIPAL COMPONENT ANALYSIS ON FACTORS AFFECTING CHILD POVERTY ONE YEAR PERIOD.

	Institutional quality & child wellbeing	Women's access to credit	School non-attendance	Women asset ownership
Under-five mortality rate	**0.738**	0.109	-0.003	0.068
Gender parity index	**-0.845**	-0.088	0.075	0.291
Ibrahim index African governance	**-0.912**	0.115	-0.239	-0.032
Stopped school: Did not like school	**0.421**	0.002	0.351	-0.311
Stopped attending school: Got married	**0.404**	-0.221	-0.053	-0.005
Women with access to credit	-0.337	**0.716**	-0.091	-0.267
Stopped schooling: Did not pass exams	0.208	**0.833**	-0.089	0.174
Child underweight	0.523	0.079	**0.739**	-0.001
Stopped schooling: School not accessible	-0.177	-0.304	**0.794**	-0.090
Stopped schooling: Family needed help	0.089	0.008	**0.900**	-0.071
Women who own a house	-0.104	0.142	-0.047	**0.951**
Women without land	0.033	0.286	0.137	**-0.754**
Stopped schooling: Could not pay sch. fees				

Note: stopped school: could not pay school fees, has not been loaded on any of the four components in Table 5.4, but loads onto the 5th component which from Table 5.3 has significant eigenvalues. This variable is included for demonstration purposes in Figure 5.2.

Table 5.4 does not meet all the criteria discussed in terms of choosing the factors to load on the components. The reason is partly due to the period under observation being only one year and therefore the number of observations are few. However, we have decided to investigate these variables for demonstration purposes of the importance of women's access to land, credit and other key factors affecting children's enrolment and retention in school and their overall wellbeing. The first component has been labelled institutional quality and child wellbeing. It has children's dislike of school as one of the factors that have been loaded heavily on it. Inadequate public expenditure on education (buildings and inputs) can lead to poor school buildings, lack of or insufficient sanitation, outdated syllabus and inadequate number of trained teachers among other factors. As a result, these factors may influence the pupils in disliking school and thereby dropping out. Got married has also been loaded on institutional quality and child wellbeing because norms of sociocultural institutions that endorse child marriage may negatively affect girls' retention in school to completion.

Ibrahim Index African Governance (IIAG) shows that poor institutional quality increases the percentage rates of U5MR, children dropping out of school to get married or because they did not like schooling. Low status of women (GPI) increases child mortality and school dropout. The first component correlates most strongly with IIAG. The second component, labelled women´s access to credit is loaded heavily by only two factors—stopped schooling because did not pass exams and women with access to credit. These factors are related because if a mother lacks access to credit, her financial opportunities are limited this may negatively impact the school performance of her children. For instance, girls may absent themselves from school to babysit while their mother is constrained to take up extra work to make up for her constrained resources. Irregularity in

school attendance consequently leads to poor performance. The third component labelled school non-attendance is heavily loaded by child underweight, school not accessible and family needed help. These factors are correlated and contribute to the reasons for not being in school. The literature reviewed in Chapter 2 on costs of early childhood under-nutrition, points out that underweight children are mostly characterized by underdeveloped cognitive ability which consequently leads to either children not attending school at all or late school entry. Children from the remotest parts of Africa may fail to attend school because of the school being too far and generally remote areas hardly have infrastructure thereby exacerbating school inaccessibility. Children who start school late are generally overage and are mostly from poor families. The prevailing family circumstances may force them either to attend school irregularly or to abandon school completely since they are involved in helping their families. The fourth component, labelled women asset ownership, is composed of women without land and women who own a house. These two factors are correlated because in rural Africa, one can only own a house if one owns a piece of land.

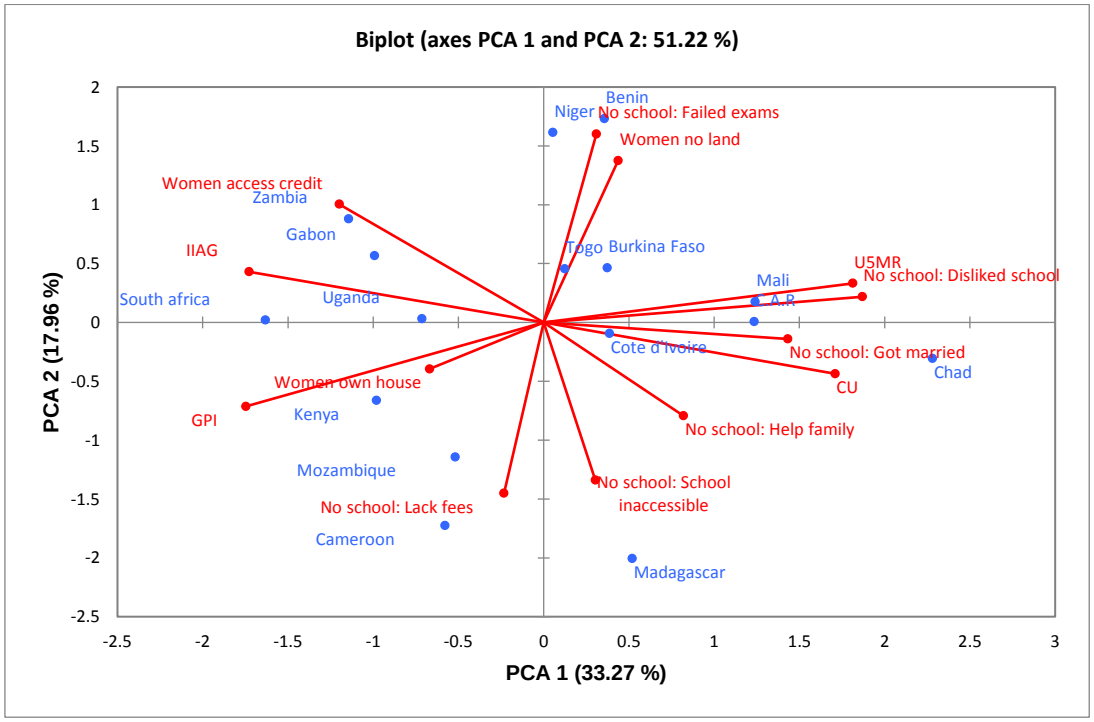


Figure 5.3 Biplot of the first two components of the factors affecting child poverty with one year period

Biplot simultaneously plots information on the observations and variables. The biplot in Figure 5.3 represents the information contained in the first two principal components and approximates 51% of the variation in the original data. Each vector represents a variable, while each point represents an observation (country). The distance between points represents the similarity between them. Points that are close together correspond to observations that have similar scores on the components displayed in the plot and also the observations that have similar values on the variables, while points away from each other have dissimilar profiles (Gower et al. 2010 and Salina et al. 2013). Women's access to credit is positively correlated to IIAG because their access to credit implies that the institutions have created an enabling environment for them to utilize credit facilities. Gabon and Zambia have an enabling environment for women to access credit. Generally, in Africa there is

gender inequality in accessing credit, because most women fail to fulfil the requirements of accessing credit from formal banks. However, microfinance institutions' (MFI) lending requirements enable some women to access them, because they charge lower interest rates than money lenders and they mostly replace collateralized loans with peer supported guarantees of group lending. However, as much as MFI terms and requirements are more accessible than other formal banking institutions, they still fail to reach out to the remotest rural areas of Africa, which are mostly inaccessible due to a lack of infrastructure (Helmore 2009).

The variable of women with no land is negatively correlated to GPI and IIAG. Good institutional quality has gender equality rules in place which will eventually reduce the number of women without land. South Africa and Uganda are near each other because both have good institutional quality. Women without land is negatively correlated to women with credit, because the lack of collateral such as land is one of the major reasons why women fail to access credit. Results not shown indicate that land ownership between men and women points to a wide disparity, an average of only 10% of Sub Saharan African rural women own land, while 61% are without any form of land. In Figure 5.3, of the five reasons for children not attending school, dislike of school is better represented, while got married and help family are far less represented as compared to lack of school fees and school being inaccessible. Niger and Benin are similar in terms of children not attending school because they failed exams. Mali and Central African Republic are near to each other because they both have high rates of child mortality and children who dislike going to school. PCA1 in Figure 5.3 accounts for the highest variance (33.27%) in the dataset while PCA 2 accounts for 17.96% and both components account for 51.22% of the variation in the dataset. Chad, Mali and CAR (Central African Republic) have scored above 1 in the first component, while Kenya and South Africa have scored above 1 but with a negative sign. Benin and Niger have scored above 1 in the second component, while Madagascar, Cameroon and Mozambique have scored above 1 but with a negative sign.

5.2.3. Principal component analysis on factors affecting child poverty over the whole period 1990-2010

The preceding subsection used principal component analysis on factors affecting child poverty for which data were available for only a short time period. In the present subsection, we use principal component analysis on factors affecting child poverty with data from the World Bank for the whole period under observation.

Table 5.5 Eigenvalue of factors affecting child poverty for the whole period

	Eigenvalue	Variability (%)	Cumulative %
F1	5.076	23.071	23.071
F2	2.909	13.225	36.296
F3	2.219	10.088	46.385
F4	1.893	8.606	54.991
F5	1.378	6.264	61.254
F6	1.234	5.608	66.862
F7	0.988	4.491	71.353
F8	0.888	4.036	75.388
F9	0.849	3.857	79.245
F10	0.681	3.095	82.341
F11	0.536	2.436	84.777
F12	0.507	2.305	87.082
F13	0.478	2.173	89.255

F14	0.429	1.948	91.203
F15	0.416	1.889	93.093
F16	0.407	1.850	94.943
F17	0.277	1.259	96.202
F18	0.241	1.097	97.299
F19	0.196	0.889	98.188
F20	0.155	0.703	98.891
F21	0.130	0.592	99.484
F22	0.114	0.516	100.000

Out of the 22 principal components in Table 5.5, we chose the first seven components for they explain 71% of the variation in the dataset. Table 5.6 depicts the factors that have been loaded on individual components.

Table 5.6 RESULTS OF PRINCIPAL COMPONENT ANALYSIS ON FACTORS AFFECTING CHILD POVERTY FOR THE WHOLE PERIOD

	(1) Institutional quality & PSE	(2) Out of school children	(3) Household income	(4) Public expenditure	(5) Women's status	(6) Crop production	(7) Child underweight
U5MR	**-0.623**	0.070	0.120	-0.029	-0.144	-0.513	-0.210
PSE	**0.640**	-0.039	0.136	0.120	-0.063	0.346	0.177
RS	**0.787**	0.038	-0.097	0.087	0.036	0.040	-0.025
IIAG	**0.697**	-0.056	-0.197	0.025	0.101	-0.031	0.170
FPST	**0.650**	0.052	-0.030	-0.075	0.597	0.046	-0.120
PRD	**0.626**	-0.074	-0.440	-0.071	-0.317	0.202	-0.211
CM.	**0.535**	-0.298	0.362	-0.055	0.153	-0.170	0.194
ORP	0.170	**0.819**	0.097	0.072	0.083	0.106	0.146
WF	-0.045	**0.758**	0.096	0.002	-0.110	0.050	0.099
CL	-0.014	**0.877**	0.009	0.000	0.077	-0.081	-0.073
GOS	-0.204	**0.796**	-0.094	-0.045	-0.024	-0.055	-0.049
PLG	0.353	-0.020	**-0.549**	-0.018	0.198	-0.035	0.179
FAG	-0.389	-0.045	**0.643**	0.068	0.058	-0.177	-0.364
RFM	0.136	0.119	**0.853**	-0.128	0.094	0.024	0.056
HE	0.101	0.058	0.012	**0.939**	0.096	-0.006	0.008
AGV	0.016	-0.034	-0.086	**0.941**	-0.030	-0.076	-0.003
GPI	0.483	0.052	0.133	0.132	**0.584**	0.305	0.017
FSV	-0.055	-0.029	-0.009	0.033	**0.846**	0.104	-0.006
CPI	0.070	0.042	-0.015	-0.108	0.154	**0.864**	0.013
CU	-0.459	0.066	-0.098	-0.127	-0.082	-0.256	**-0.687**
ELF	-0.186	0.317	-0.180	-0.098	-0.275	-0.231	**0.678**
MPH	0.195	-0.014	-0.210	-0.009	0.116	0.416	**0.494**

Note: U5MR-underfive mortality rate, PSE-primary school education, RS- rural sanitation, IIAG- Ibrahim index African governance, FPST-female primary school teacher, CM.- child marriage, ORP- Orphans currently living, WF- wood fuel, CL-child labour, GOS-girls out of school, PLG-persistence to the last grade of primary school, FAG-female employed in agriculture, HE- health expenditure per capita, AGV- agriculture value added, GPI-gender parity index, FSV- female enrolment in secondary vocation school, CPI-crop production index, CU-child underweight, ELF-ethnolinguistic fractionalization, MPH-mobile phone subscribers.

The estimated coefficients in Table 5.2 were more child and women's status specific and thus performed better in fulfilling the principal component criterion, while Table 5.6 has missed out on fulfilling some of the criteria. For instance, the criterion of all components having at least three loadings is not met in three of the seven

components. The criterion of most of the components having a high factor loading on only one component, and on the rest having a factor loading below the cut off minimum point (0.40) has not been met. The first component, named institutional quality and PSE, consists of U5MR (under-five mortality rate), PSE (primary school enrolment), RS (rural sanitation), IIAG (Ibrahim index African governance), FPST (female primary school teacher), PRD (paved roads) and CM (child marriage). Good institutional quality (IIAG) creates a conducive environment that reduces U5MR, increases PSE, RS, FPST and PRD. All the coefficients in the first component are positively correlated with the exception of U5MR and CM. RS is more highly correlated to the first component for it has the highest loading. The second component is loaded heavily by ORP (orphans who are currently living), WF (wood fuel), CL (child labour) and GOS (girls out of school). This component is labelled out of school children because the variables that have been loaded on it tend to describe children out of school who are mostly orphans, are poor and thus are victims of poor shelter (wood fuel). To make a living constrains them to become child labourers, and during times of hardship, normally girls are the first to be pulled out of school.

The third component is household income, and it is loaded heavily by PLG (pupils who persist to the last grade of primary), FAG (female employment in agriculture) and RFM (ratio of female to male labour force participation rate). The three estimates can be described as contributors to household income either directly or indirectly in the long-run. For instance, to have education is important, because it enables one to participate in agricultural extension programs (FAG) and also to be updated on marketing information. Notwithstanding gender inequality in the labour market (RFM), women with education stand a better chance of competing with men than women without education, high RFM increases FAG, while low RFM reduces PLG.

The fourth component, labelled public expenditure, is loaded by HE (health expenditure) and AGV (agricultural value added). The outcome of the performance of HE and AGV largely depends on the public resources invested in the health and agricultural sectors. The fifth component, named women's status, is loaded heavily by GPI (gender parity index) and FSV (female enrolment in secondary vocational education) which are associated with women's status. The two coefficients are correlated because it takes high GPI for women to survive to secondary education. The seventh component is named child underweight (CU), and it is loaded by CU, ELF and MPH (mobile phone subscribers). ELF and MPH were explained in Chapter 3, and these two variables are positively correlated but negatively correlated with CU. The seven principal components in Table 5.6 account for 71% of the variation in the dataset.

5.3 Country classification using agglomerative hierarchical clustering (AHC)

The foregoing subsection with the help of PCA method has identified the most important variables affecting child poverty. The present subsection investigates the question on country clusters based on factor scores of respective African countries in the most important variables affecting child poverty. We attempt to answer the question in the subsequent subsections. Subsection 5.3.1 presents results of cluster analysis of country similarity and dissimilarity in the factors affecting child poverty; 5.3.2 presents results of cluster analysis based

on country quartiles of % averages of factors affecting child poverty; and 5.3.3 presents results of cluster analysis based on averages of factor scores of individual countries under respective quartiles in child poverty factors.

5.3.1 Results of cluster analysis of country similarity and dissimilarity

We use pre-treated data of over a five-year period of factor scores of African countries in factors affecting child poverty generated by principal component analysis (PCA) to cluster countries using agglomerative hierarchical clustering. Twenty-eight countries are now under observation instead of thirty, because Guinea Bissau and Mauritius have no DHS data for the variables under investigation. Factor scores are responses weighted by the factor loadings, showing how each variable relates to the principal component. The factor weights are used in conjunction with the original variable values to calculate a score for each observation**.** Figure 5.4 below presents the graphical illustration (dendrogram) of the arrangement of the clusters.

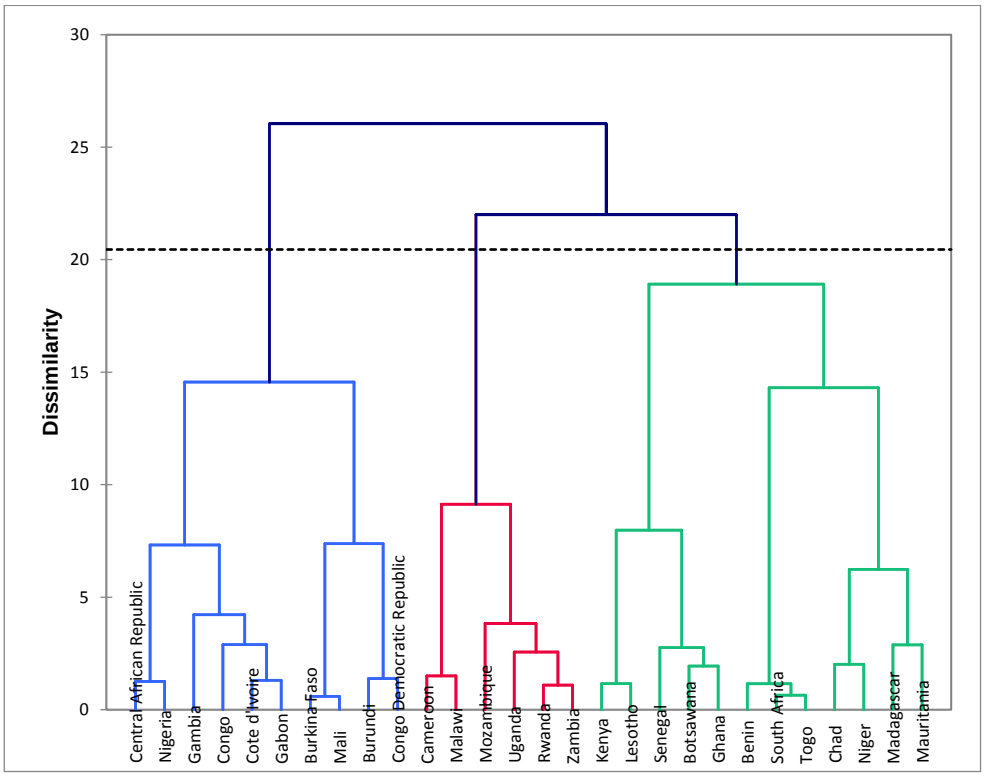


Figure 5.4 Dendrogram using Ward linkage and Euclidean distance

The lines on the horizontal axis in Figure 5.4 represent the clusters to which the countries belong, and their height on the vertical axis represents the distance (dissimilarity). The distance between merged clusters (0-26) is increasing with the level of the merger. The broken horizontal line just above 20 represents the cut-off point that determines the number of clusters, which in the present case are three. The level of 20 in the final dendrogram happens to coincide with a large jump in the clustering levels, the node where cluster 2 and 3 are clustered is at level 22, while the next node where cluster 1 is merged is at level 26, thus 20 is the most convenient level to cut the tree.

Tables 5.7 A, B, and C Central objects, distance between objects and results of cluster analysis of African countries

Tables 5.7A Central objects.

Class	Child marriage	Women's status	Institutional quality	Women's education	Care for women & children	Assets & participation	Health sanitation
1 (Togo)	0.720	-0.572	0.988	0.346	-0.458	1.256	-0.752
2 (Congo Dem Rep)	0.535	1.145	-1.342	0.034	0.592	0.379	0.494
3 (Uganda)	0.616	0.057	1.141	-0.189	0.818	-0.839	0.662

Table 5.7B Distance between central objects

	(Togo)	2 (Congo Dem Rep.)	3 (Uganda)
1 (Togo)	0	3.454	2.955
2 (Congo Dem Rep.)	3.454	0	2.994
3 (Uganda)	2.955	2.994	0

Table 5.7C Results by class

Class	1	2	3
Objects	12	10	6
Sum of weights	12	10	6
Within-class variance	6.693	4.803	3.353
Min. distance to centroid	1.547	1.376	1.112
Ave. distance to centroid	2.402	2.048	1.639
Max. distance to centroid	3.439	2.672	2.171
	Benin	Burkina Faso	Cameroon
	Botswana	Burundi	Malawi
	Chad	Central African Republic	Mozambique
	Ghana	Congo Republic	Rwanda
	Kenya	Congo Dem. Republic	Uganda
	Lesotho	Cote d'Ivoire	Zambia
	Madagascar	Gabon	
	Mauritania	Gambia	
	Niger	Mali	
	Senegal	Nigeria	
	S. Africa		
	Togo		

Table 5.7C presents countries grouped into three clusters, with the first cluster representing the largest number of countries (12): Benin, Botswana, Chad, Ghana, Kenya, Lesotho, Madagascar, Mauritania, Niger, Senegal, South Africa and Togo. The second cluster consists of ten countries: Burkina Faso, Burundi, Central African Republic, Congo Republic, Congo Democratic Republic, Cote d'Ivoire, Gabon, Gambia, Mali and Nigeria, while the third cluster represents the smallest cluster composed of six countries: Cameroon, Malawi, Mozambique, Rwanda, Uganda and Zambia.

A cluster is a set of countries in which each country is closer to the prototype that defines the cluster than to the prototype of any other cluster. The prototype is the central object identified with a country whose value is the closest to the average of all the countries in the cluster. Table 5.7A shows the central object of the cluster 1 is Togo, while that of cluster 2 is Democratic Republic of Congo and in cluster 3 is Uganda. The distance between these central objects is the difference in their values for instance the distance between Togo and Democratic Republic of Congo is 3.454, and that of Togo with Uganda is 2.955, the distance between Uganda and Democratic Republic of Congo is 2.994 (table 5.7B).

Table 5.8 Percent averages of factors affecting child poverty across the 3 clusters

	First cluster	Second cluster	Third cluster
Teenage mothers, nutrition & orphan school attendance			
Women giving birth by age 15	6.36	**7.21**	7.08
Breastfeeding & complementary foods	20.29	15.82	**21.32**
School attendance orphans aged 10-14	67.99	63.46	**82.24**
Women's status			
Women final say in social networking	57.74	48.00	**61.66**
Wife earns less than husband	71.60	**81.09**	72.19
Women in agriculture	50.75	59.81	**75.28**
Husband and wife joint decision- use of wife´s earnings	28.56	22.15	**36.41**
Households possessing a mobile telephone	58.22	**60.50**	49.74
Institutional quality & child wellbeing			
Ibrahim Index African Governance	54.75	46.45	**55.07**
Primary school enrolment	76.43	62.90	**79.37**
Out of school children	25.90	**39.19**	7.95
Under-five mortality rate	9.75	**14.10**	9.97
Child underweight	23.41	**27.29**	19.70
Thin women BMI (<18.5)	**15.27**	14.88	9.78
Women's education and shelter			
Women with secondary or higher education	**22.88**	13.91	10.30
Women who are literate	**57.17**	45.24	32.00
Cooking with wood	62.78	67.48	**74.41**
Care for women and children			
Birth interval 24-35 months	36.24	**38.31**	38.03
Birth order 5+	33.86	**36.20**	33.74
Skilled antenatal care	72.87	70.80	**81.10**
Skilled birth attendant	39.95	40.70	39.94
Assets & child participation			
Households with a radio	**62.88**	62.23	60.15
Children with a birth certificate	46.89	**53.37**	27.62
Lowest wealth quintile	19.58	**19.85**	19.79
Gender parity index & health			
Gender parity index	85.58	83.47	**94.12**
DPT3 vaccination	59.87	50.45	**68.65**
Unprotected well water	**19.37**	17.81	16.84
No toilet facilities	**40.89**	25.26	14.07

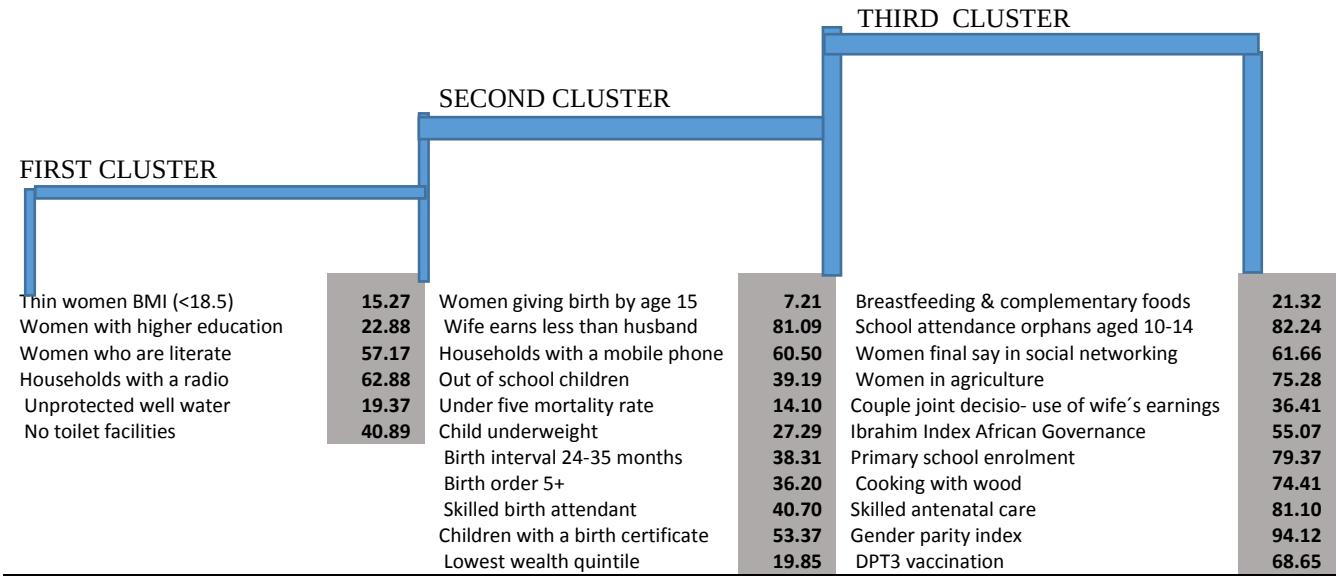
Source: Own elaboration using data from DHS, latest 5year period.

We describe the characteristics of each cluster using original data. The summary of the variables in clusters using mean values of the original variables in Table 5.8 is helpful for comparison of the three clusters in the context of factors affecting child poverty in Africa. Highlighted numbers in Table 5.8 depict where individual clusters have the highest averages. Countries in the first cluster have the highest percentage of malnourished women, literate women and women with higher levels of education; households with a radio, unprotected water and without toilet facilities. Normally it could be expected that educated women would have the knowledge to improve their nutritional status as well as sanitation, but the success of putting their knowledge to use depends on the enabling environment to access other productive resources.

The mean values of the second cluster point to highest percentages of factors that increase child poverty such as women giving birth by age 15, wife earns less than husband, OOSC, U5MR, CU, birth order 5+ and lowest wealth quintile. These factors are inter-correlated, they reinforce each other exacerbating child poverty issues. However, countries in this cluster are also characterized by averages of high percentages of child poverty-reducing factors such as skilled birth attendant, birth interval 24-35 months, households with a mobile phone and children with birth certificates. The third cluster is the opposite of the second cluster, and the mean values suggest that countries in this cluster are child friendly for they have high percentages of breastfeeding and complementary foods, school attendance orphans aged 10-14, primary school enrolment and DPT_3

vaccination. This cluster is also characterized by high percentages of factors conducive to improved women's status such as women's final say in social networking, women in agriculture, couple's joint decision on the use of wife's earnings, gender parity index and skilled antenatal care. The probable explanation for the third cluster having better outcomes for both child wellbeing and women's status is because this cluster happens to have the highest percentage of good institutional quality (Ibrahim Index African Governance). Table 5.9 is a list of variables from Table 5.8 where individual clusters have the highest percentages.

Table 5.9 Highest percent averages of factors affecting child poverty across the three clusters



5.3.2 Results of cluster analysis based on country quartiles of % averages of factors affecting child poverty

We follow Gwatkin et al. of World Bank (2007), Vyas and Ranayake (2006) and Houweling et al. (2003) by dividing the factor scores of the first principal component into quartiles, with the objective of classifying countries into quartiles. Quartiles are calculated for each country by weighting country factor scores by the coefficient of the first principal component. The choice of the first principal component is because it is assumed to represent child poverty since it explains the highest variation in the dataset (27% as evidenced in Table 5.1).

Table 5.10 Country quartiles of % averages of factors affecting child poverty

Country	1st quartile	Median quartile	3rd quartile	4th quartile
Teenage mothers, nutrition & orphan school attendance				
Women giving birth by age 15	6.05	8.95	7.94	4.50
Breastfeeding & complementary foods	18.42	21.98	23.72	17.71
School attendance orphans aged 10-14	68.69	60.05	73.74	79.37
Women's status				
Women final say in social networking	56.08	43.63	63.13	60.44
Wife earns less than husband	77.89	78.35	70.62	72.19
Women in agriculture	59.04	63.20	66.00	57.60
Couple's joint decision- use of wife´s earnings	24.69	25.28	30.40	35.66
Households possessing a mobile telephone	62.15	47.90	51.96	66.96
Institutional quality and child wellbeing				
Ibrahim Index African Governance	54.63	43.23	50.18	57.23
Primary school enrolment	74.34	71.53	73.96	75.11
Out of school children	28.74	32.16	18.76	22.80

Under-five mortality rate	11.06	12.95	11.17	10.01
Child underweight	20.23	24.65	21.38	24.90
Thin women BMI (<18.5)	15.49	14.36	13.73	11.07
Women's education & shelter				
Women with secondary or higher education	26.58	10.95	15.71	14.52
Women who are literate	50.21	46.14	42.51	44.29
Cooking with wood	62.00	73.58	70.93	53.76
Care for women and children				
Birth interval 24-35 months	39.77	38.20	36.42	34.14
Birth order 5+	34.36	37.38	34.51	30.61
Skilled antenatal care	75.75	70.58	71.21	81.83
Skilled birth attendant	49.57	33.26	37.69	42.71
Assets and child participation				
Households with a radio	63.90	59.33	57.79	65.14
Children with a birth certificate	50.83	43.14	46.84	39.01
Lowest wealth quintile	19.69	19.81	19.63	19.86
Gender parity index and health				
Gender parity index	87.65	79.01	87.35	82.20
DPT3 vaccination	72.87	43.57	55.01	63.58
Unprotected well water	13.69	19.43	22.02	14.38
No toilet facility	23.60	27.03	39.33	22.95

There are no outstanding differences in the patterns of the averages of the factors affecting child poverty across the quartiles. However, Table 5.10 indicates that country grouping based on factor scores of the first principal component labelled child marriage suggests that women giving birth by age 15, breastfeeding and complementary foods; and orphans school attendance are important factors in explaining child poverty. The reasons for this are that the fourth quartile, which is assumed in terms of socioeconomic factors to have the highest socioeconomic indicators in comparison to the other quartiles, has the highest percentages of school attendance by orphans, couple's joint decision on the use of wife's earnings, Ibrahim Index African Governance, primary school enrolment, and skilled antenatal care; and lowest percentages of U5MR, thin women BMI (<18.5), birth order5+ and population without toilet facilities.

Women's impact on child wellbeing largely depends on their status. We have viewed women's status through the lens of Sen's theory (Sen 1981) which explains the socioeconomic status of women in terms of women's access, possession, use and control over their resources and above all the amounts of endowment and entitlements taken away from them. The socioeconomic indicators of the status of women in Table 4.10 are women's literacy, education, nutritional status, participation in decision making, employment, earnings, access to health facilities and information. The averages of women's literacy rate and secondary or higher levels of education are very low, particularly higher education, across all the country quartiles. Results not shown have indicated that African countries with less than 15% of rural literate mothers have the highest percentages of the total number of children (7-16years) who have never been to school. Conversely, countries with over 50% of literate rural women have mostly below 15% of children who have never been to school. Women's access to skilled antenatal care is well represented across the quartiles whereas access to skilled birth attendant is poorly represented across all the quartiles.

The first quartile has the highest percentages of women who are literate, women with secondary and higher levels of education, GPI. At the same time, this quartile has the lowest percentages of child underweight, and the highest percentages of children with birth certificates and DPT_3 vaccination, and it is notable that these set of variables are largely associated with women's education status.

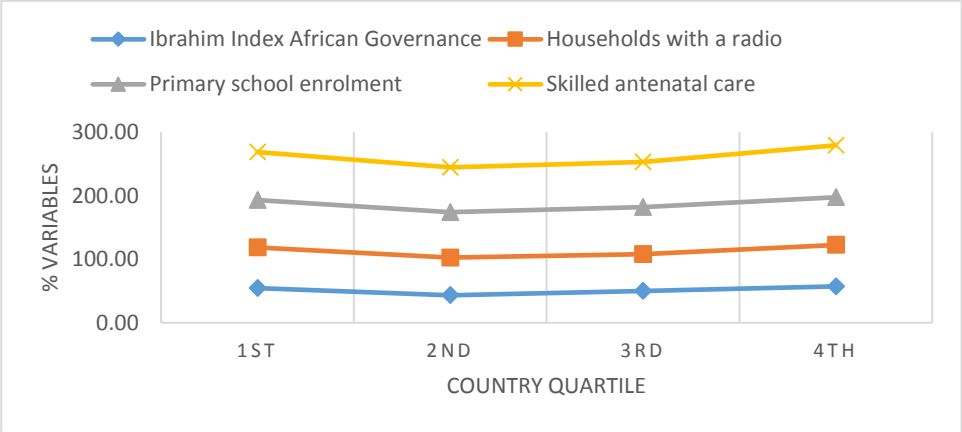


Figure 5.5 comparison of % of selected indicators of child poverty across quartiles

Figure 5.5 illustrates that countries in the fourth quartile have the highest percentages of Ibrahim Index African Governance (institutional quality), households with a radio, primary school enrolment and skilled antenatal care. The results of this figure help in understanding why the fourth quartile in Figure 5.5 has the lowest percentages of U5MR, women giving birth by age 15 and malnourished women.

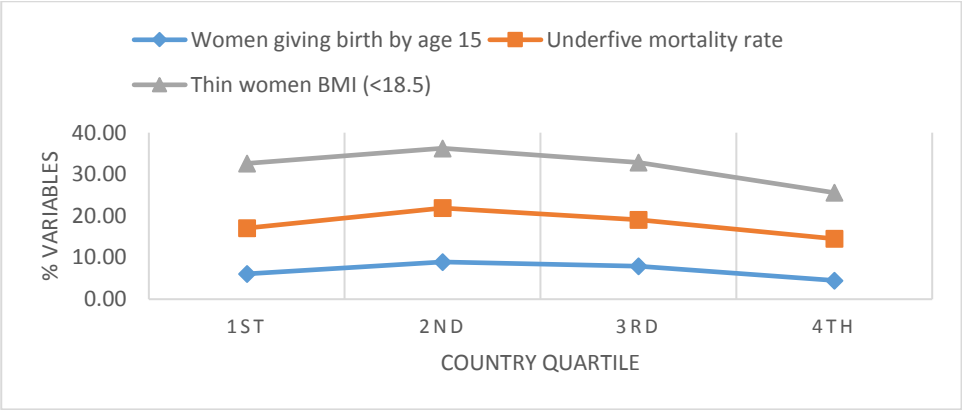


Figure 5.6 Comparison of % of women's status and under-five mortality across quartiles

Figure 5.6 depicts that countries in the first and second quartiles which are assumed to be poor fare worse in terms of having high percentages of women giving birth at age 15, U5MR and malnourished women in comparison to the fourth quartile which demonstrates lower percentages

5.3.3 Results of cluster analysis based on averages of factor scores of country quartile in child poverty factors

Table 5.11 Country quartile of averages of factor scores of factors affecting child poverty

Observation	Teenage mothers' nutrition & orphan school attendance	Low status of women	Institutional quality & child wellbeing	Women's education and shelter	Care for women and children	Assets and participation	Gender parity index and health
1st quartile							
Benin	-0.354	-0.490	0.252	1.075	-0.295	0.270	-0.134
Botswana	-0.140	-1.355	-0.314	-0.400	-0.542	0.170	-0.103
Burundi	-0.235	0.212	0.202	-0.352	-0.015	-0.666	0.148
Congo	-0.217	0.496	-0.461	0.726	-0.200	-1.048	0.502
Gambia	-0.365	-0.342	0.266	-0.420	-0.079	-0.333	0.426
Kenya	-0.221	-0.258	0.229	-0.366	0.141	-0.005	-0.061
Niger	-0.166	1.264	-0.090	-0.336	-0.082	0.710	0.036
Senegal	-0.161	-0.535	-0.139	-0.348	-0.046	0.170	-0.228
2nd quartile							
Central African Republic	-0.095	0.982	-0.214	0.019	-0.608	-0.589	-0.253
Congo Dem. Republic	-0.004	0.441	-0.146	0.315	-0.230	-0.506	-0.731
Cote d'Ivoire	-0.046	0.668	0.056	0.132	-0.344	0.163	-0.136
Mali	-0.001	0.232	0.084	0.143	0.505	-0.296	0.368
Mauritania	-0.106	0.537	-0.044	0.838	0.011	0.257	0.070
Uganda	-0.023	-0.685	0.264	-0.518	0.258	-0.078	-0.004
3rd quartile							
Cameroon	0.055	-0.506	-0.106	-0.060	-0.142	-0.382	-0.124
Chad	0.056	2.042	-0.254	-0.516	0.072	0.182	0.236
Ghana	0.099	-0.565	-0.226	-0.083	-0.142	0.209	0.340
Madagascar	0.069	0.554	0.039	0.934	0.245	0.176	-0.184
Malawi	0.004	-0.590	-0.291	0.396	0.132	-0.334	-0.013
Mozambique	0.033	-0.417	-0.112	0.240	-0.091	0.205	0.291
Togo	0.077	-0.398	0.341	0.802	0.459	0.443	-0.118
4th quartile							
Burkina Faso	0.344	0.311	0.297	-0.006	-0.246	-0.271	-0.237
Gabon	0.380	-0.871	-0.438	0.380	0.409	-0.224	-0.089
Lesotho	0.146	0.218	0.415	-0.628	0.056	0.395	-0.020
Nigeria	0.111	1.067	0.255	-0.462	-0.081	-0.210	-0.096
Rwanda	0.141	-1.044	-0.150	-0.676	-0.109	0.394	-0.022
South Africa	0.244	-0.216	-1.205	1.919	-0.288	0.650	-0.036
Zambia	0.130	-1.067	0.104	-0.683	-0.261	-0.097	0.666

Positive loadings associated with specific variables imply that these variables contribute positively to this component, hence countries scoring high on these variables will tend to have higher factor scores on this particular dimension. Conversely, negative loadings have an opposite effect to that of positive loadings. Based on this understanding, Table 5.11 depicts factor scores representing how much each country relates to the variables within each component.

The method of clustering countries into quartiles in Table 5.11 is similar to that in Table 5.10 based on the factor scores of the first component, the only difference is that Table 5.11 depicts averages of factor scores of individual countries within a quartile, while table 5.10 depicts total % averages of the factors affecting child poverty of all the countries within respective clusters. The results of Table 5.11 of the first component reflects the nature of country classification, for countries in the first and second quartiles all have negative signs thus have an inverse relationship with the first component, while countries in the third and fourth quartiles have positive signs implying that they have a direct relationship with the first component. In the second component, labelled women's status, Niger, Chad and Nigeria have scores with greater values with positive signs thus having a direct relationship with women's status (the variables that have been loaded heavily on the second component). Conversely Botswana, Rwanda and Zambia have greater values with a negative sign pointing to inverse relationship with the component. To underscore these factor scores we take Niger from the first quartile and Rwanda from the fourth quartile as cases in point by comparing their averages in the variables that have been loaded heavily on the second component: Women's final say in social networking Niger 30%, Rwanda 76%; wife earns less than husband Niger 85%, Rwanda 66%; women in agriculture Niger 40%, Rwanda 87%; couple's joint decision on the use of wife's earnings Niger 8%, Rwanda 56%; households possessing a mobile phone Niger 28% and Rwanda 53%. The comparison of Niger and Rwanda illustrates why Niger has factor scores with greater value with a positive sign because it contributes positively to the low status of women, while Rwanda contributes negatively to the low status of women.

In the third component on institutional quality and child wellbeing, South Africa has factor scores of greater values with a negative sign which connotes it has an inverse relationship with poor institutional quality, U5MR, CU, OOSC and malnourished women. In the fourth component, labelled women´s education and shelter, South Africa and Benin have a direct effect by increasing the percentages of women with higher levels of education. In the sixth component, labelled assets and participation, Congo Republic has factor scores of greater value with a negative sign for it has high percentages of households with a radio and children with birth certificates and thereby reduces child poverty channelled through lack of assets and low birth registration.

5.4 Pre-primary school enrolment and reasons for not completing primary school

Subsection 5.4 and 5.5 uses selected important variables from PCA to elaborate further on education and the low status of women as important factors affecting child poverty. Lack of pre-primary school education contributes to rising percentages of CU and OOSC as already explained in Chapter 3. This subsection illustrates with the help of Table 5.12 that countries with low percentages of pre-school enrolment have high percentages of CU and OOSC.

Table 5.12 % pre-primary school enrolment versus % child underweight, OOSC, gender parity index and female literacy rate across Africa

INDEX	Pre-primary school enrolment	Child underweight	Out of school children	Gender parity index	Female literacy rate
Chad	1	33	49	59	14.88
Congo Republic	1	18	48	81	55.51
Burkina Faso	2	32	63	74	13.93
Burundi	2	34	43	85	47.17

Cote d'Ivoire	2	21	45	79	37.91
Mali	2	31	47	75	16.56
Mauritania	2	29	36	96	47.29
Niger	2	42	64	70	12.24
Zambia	2	20	19	94	60.18
Central African Republic	4	23	39	68	-
Togo	4	20	16	78	42.14
Congo Democratic R.	5	31	37	93	-
Guinea Bissau	5	21	48	65	34.04
Benin	6	24	32	66	23.37
Madagascar	6	36	34	97	63.45
Senegal	6	19	38	89	33.63
Rwanda	7	22	16	101	63.63
Nigeria	13	30	36	85	45.82
Uganda	13	19	7	93	57.61
Gabon	14	9	8	100	76.50
Cameroon	15	18	14	86	60.87
Botswana	17	13	16	100	79.33
Gambia	21	19	41	90	32.74
Lesotho	24	16	29	106	93.82
South Africa	38	9	10	97	83.98
Kenya	44	18	31	99	79.46
Ghana	58	21	35	94	56.51
Mauritius	90	15	7	100	80.45

Table 5.12 shows that countries like Uganda, Gabon, Cameroon, Botswana, Mauritius, Kenya, South Africa and Lesotho with an average of over 13% pre- primary school enrolment between 1990-2010, had under 35% OOSC and below 20% UC. However, countries like Chad, Burkina Faso, Burundi and Mali had an average of less than 3% pre-primary school enrolment between1990-2010, have an average of over 40% of their children out of school and an average of over 30% underweight children. The findings shown in Table 5.12 suggests that lack of pre-primary school enrolment is among the factors that positively contribute to OOSC and CU.

According to DHS data, the percentage total of school attendance in Africa has declined in all the countries under observation with the exception of Madagascar whose school attendance has risen from 69.3% for children aged 6-10 to 75.8% for children aged 11-15. Why has school attendance declined in Africa? Table 5.13 presents the reasons for not completing primary school given by both rural and urban children across selected countries of Sub Saharan African.

(*i) Why has school attendance declined? (Why are children out of school?)*

Table 5.13 depicts data gathered by DHS on reasons children gave for not completing school. These reasons can be summarised under social-cultural factors, characteristics of a child, household income, school inputs and quality of education; and geographical location. Most of Africa has low percentages of children being out of school because of child marriages, teenage pregnancies, child minders, helping family, child labour and proximity of school. However, lack of school fees, dislike of school and failed exams have turned out to be the major reasons behind school dropout.

Lack of school fees – The estimate of lack of school fees in Table 5.4, did not load heavily on any of the first four components (but loaded on the fifth component results not included in Table 5.4), children's response in Table 5.13 suggests that it is a major cause of school dropout. Lack of access to education and low school attendance are directly linked to poverty. Out of the 16 countries in the table, only Mali and Niger had

proportions below 10% of children not completing primary school because of lack of school fees. The rest of the countries had over 10% of their children being out of school because of lack of school fees. Some countries had over 50% of their children out of school because of lack of school fees: Uganda had 68% and Kenya had 52.8% urban children out of school due to lack of school fees. A majority of orphans are more likely to be out of school because of lack of school fees. Appendix 3, shows Table 3 on school attendance rate of orphans aged 10-14 by residence, sex, ratio of orphans to non-orphans in school attendance and wealth quartile; and Figure 2 on averages of children who are orphans and households with orphans in Africa. *Disliked school* – Over 10% of the children in nine out of the 16 countries in Table 5.13 dropped out of school because they did not like school. Teachers with a bad attitude towards students drives children out of school. In Ghana, a 14-year old boy stated, "*it was a friend who said because of how the teachers were beating us we should drop out and go to the lorry station to cart goods to make some money*" Ali (Kwame 2007). The curriculum content in rural schools is similar to that of urban schools, and its contents are of little relevance to the local realities and societal needs and therefore is not of much interest to rural children and subsequently discourages them from attending school.

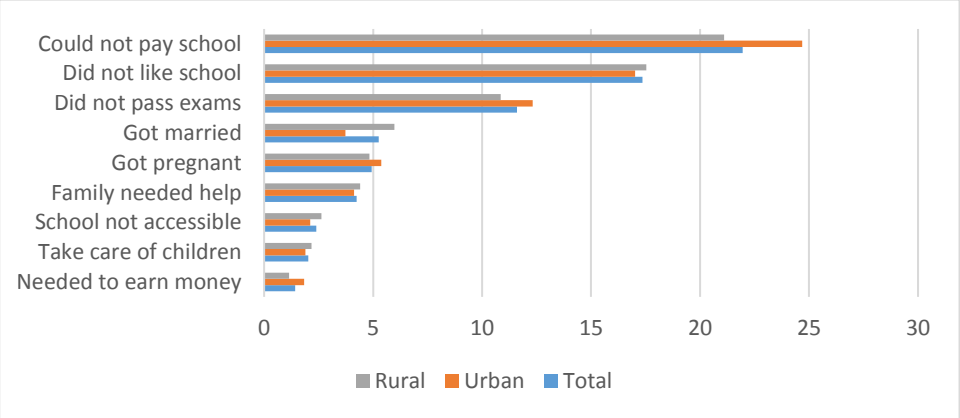


Figure 5.7 % children give reasons for not attending school
Data Source: Demographic Health Surveys (various years)

Figure 5.7 summarises the reasons for African children not attending or completing primary school. Lack of money to meet school expenses is the main reason and surprisingly it is higher in urban areas, whereas it is normally expected to be higher in rural areas, because rural areas tend to be poorer in comparison to urban areas. Probably is because the majority of children out of school in urban areas are those from the slums, and generally the standard of living of poor people in urban slums is worse than that of poor people in rural areas who although they are poor, are not exposed to the woes of slum life which exacerbate the already low economic status of the slum dwellers. Besides lack of school fees, the other big issues that need to be addressed are to make schooling become an activity that African children look forward to going, and improving Africa's school performance.

Table 5.13 % children give reasons for not completing primary school by residence across selected countries of Sub Saharan Africa

	Country	Benin	Burkina	C.dIvoire	Mali	Niger	Togo	Cameroon	C.A.R	Chad	Gabon	Kenya	Madagascar	Mozambique	Uganda	Zambia	SouthAfrica
	Survey	1996	1999	1999	1996	1998	1998	1998	1995	1997	2000	1998	1997	1997	1995	1996	1998
Got pregnant	Total	0.2		0.3	0.6		4.5	4.8	4.4	2.7	20.9	6.9	1.6	5.8	4.0	5.0	17.2
	Urban	0.4		0.6	0.6		3.3	3.3	5.4	4.9	19.0	3.5	3.0	6.5	5.6	7.7	22.1
	Rural				0.5		5.3	5.3	3.3	1.7	24.4	7.5	1.3	5.5	3.7	3.8	15.0
Got married	Total	1.1	1.6	0.3	6.4	3.6	0.8	7.8	3.0	16.6	2.5	7.0	4.9	16.5	4.4	3.3	4.3
	Urban	1.2	0.8	0.6	4.4	0.9	0.6	8.8	1.8	15.1	2.5	4.9	3.1	7.0	1.8	2.2	3.9
	Rural	0.9	2.2		9.0	5.2	1.0	7.5	4.3	17.3	2.3	7.3	5.3	20.3	4.8	3.8	4.5
Childminder	Total	1.5	1.0	0.3	2.9	1.5	1.8	2.2	7.6	3.3	1.2	0.7	2.1	1.9	2.2	1.2	0.9
	Urban	1.5	2.4	0.6	1.0	1.7	1.8	1.4	6.6	3.2	1.3	2.8	2.2	1.9	0.6	0.4	0.8
	Rural	1.4			5.4	1.4	1.8	2.5	8.7	3.4	1.0	0.3	2.1	1.9	2.4	1.6	0.9
Help family	Total	4.5	2.8	3.1	13.3	2.3	3.3	4.7	1.8	7.2	2.6	0.6	13.4	4.7	1.7	0.7	1.2
	Urban	3.2	2.4	3.7	11.4	2.4	3.6	4.9	2.2	6.1	3.2	0.0	15.0	4.7	1.0	0.2	2.0
	Rural	6.6	3.0	2.6	15.7	2.3	3.1	4.7	1.3	7.7	1.5	0.7	13.0	4.6	1.8	0.9	0.9
Lack school fees	Total	10.8	18.8	23.1	3.0	1.9	16.8	38.6	17.1	10.8	15.5	29.2	21.4	22.3	68.0	36.6	17.4
	Urban	10.1	15.2	21.1	3.3	2.7	20.7	29.9	19.4	10.4	17.3	52.8	26.9	33.7	75.6	39.8	15.9
	Rural	11.8	21.3	24.7	2.5	1.4	13.9	41.3	14.7	11.1	12.0	25.2	20.1	17.6	67.0	35.2	18.0
Working	Total	3.7	0.3	1.9	1.7		2.7	1.1	1.4	0.2	0.6	0.6	3.8	1.0	0.3	0.8	2.6
	Urban	4.9	0.8	1.1	3.0		2.2	1.6	1.8		0.4	0.7	5.8	2.4	0.8	1.2	2.7
	Rural	1.8		2.6			3.0	0.9	1.0	0.2	1.0	0.6	3.3	0.4	0.3	0.7	2.6
Failed exams	Total	25.4	27.7	31.8	8.0	28.7	20.5	0.6	8.7	2.2		0.8	12.0	6.0	0.5	0.5	0.6
	Urban	30.4	30.1	29.3	8.8	27.7	22.3	1.4	10.0	1.8		2.3	12.0	7.3	0.9	0.5	0.0
	Rural	17.6	26.1	33.8	6.9	29.3	19.2	0.3	7.2	2.4		0.6	12.0	5.4	0.5	0.5	0.9
Dislikedschool	Total	27.8	25.9	25.4	34.1	32.3	8.4	5.5	25.7	25.7	9.0	8.3	18.7	4.5	3.1	19.0	4.3
	Urban	27.8	27.2	28.0	35.5	40.0	7.7	7.3	19.3	19.7	9.0	11.0	14.2	2.8	1.3	15.1	6.4
	Rural	27.9	25.0	23.4	32.2	27.8	8.9	5.0	32.5	28.6	9.2	7.8	19.8	5.2	3.3	20.7	3.4
Schooinaccess	Total	1.2	1.6	0.5	3.3	0.9	1.6	7.6	2.0	4.2	0.9	0.3	4.2	1.9	0.3	6.6	1.1
	Urban	0.8	0.8	1.1	3.3		1.9	12.0	1.7	1.4	0.4	0.7	4.8	1.7		3.1	0.2
	Rural	1.8	2.2		3.3	1.4	1.4	6.3	2.2	5.5	1.8	0.3	4.0	1.9	0.3	8.1	1.5

Data source: Demographic Health Survey (Various years). Note: C.A.R is Central African Republic

Failed exams – Poor working conditions of teachers in terms of instructional hours, class size and salary structure as well as inadequate school inputs negatively affects the performance of both teachers and students. According to Table 5.4 and Figure 5.3, women's access to credit (family's economic status) affects pupils' performance. These factors have consequently contributed to pupils failing exams and eventually dropping out of school. Table 5.13 shows that Benin, Burkina Faso, Cote d´Ivoire, Niger and Togo had over 20% of children out of school because of having failed exams.

Disaggregation of out-of-school children (OOSC)

Children who have not completed primary school or have never been to school can be disaggregated into six categories-(1) Children of preschool age but not enrolled, (2) children who have never been to school and will never enrol (3) children enrolled but attending school on irregular basis, (4) children who were enrolled but dropped out, (5) children who are not enrolled but will enrol at a later stage, (6) children enrolled until grade 5, but did not complete the full primary school course. Figure 5.8 shows some of the categories of the averages of OOSC.

Figure 5.8 depicts averages of different categories of OOSC, with 85% of preschool age children being out of school. An average of 51% of primary school age children have never been enrolled in school and will never enrol. We have included overage children enrolled in school because statistical reports (UNESCO 2010) point to the high probability of their dropping out.

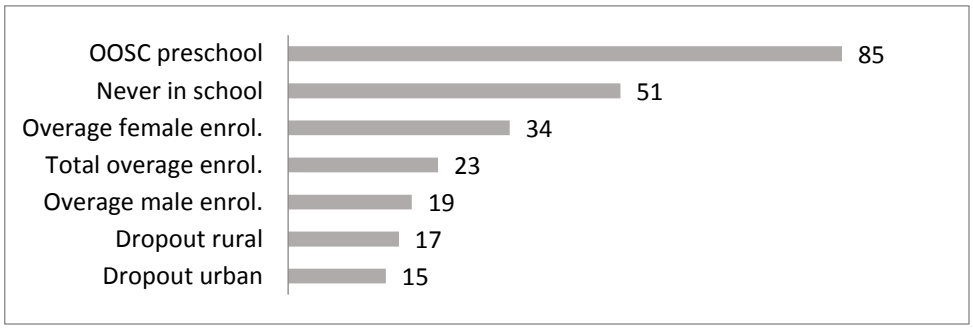


Figure 5.8 % averages of out of school children 1990-2010
Data Source: World Bank-African Development Indicators (2011)

5.5 Low status of women

Women's impact on child wellbeing largely depends on their status. We view women's status through the lens of Sen's theory (Sen 1981) which explains the socioeconomic status of women in terms of women's access, possession, use and control over their resources and above all the amounts of endowment and entitlements taken away from them. The socioeconomic indicators of the status of women identified by PCA as important factors affecting child poverty elaborated in this subsection are education, illiteracy, participation in decision making, land ownership, access to credit, employment, earnings, nutritional status and access to health facilities.

Figure 5.9 disaggregates U5MR by sex, birth interval, birth order, mother's age at the time of giving birth and education, residence, wealth quintile and the number of decisions in which a woman has a final say. Figure 5.9 indicates that children born with a birth interval below two years face the highest risk of not surviving to their fifth birthday**.** Children born of mothers below 20 years of age are at a greater risk of dying than those born of mothers in their 30s. There is a remarkable difference between under five mortality rate of mothers with no education (115) and that of mothers with secondary education (73). Under five mortality rates are higher in

households where women have no final say in decision making (108) as compared to households where women have a final say in at least three decisions (90).

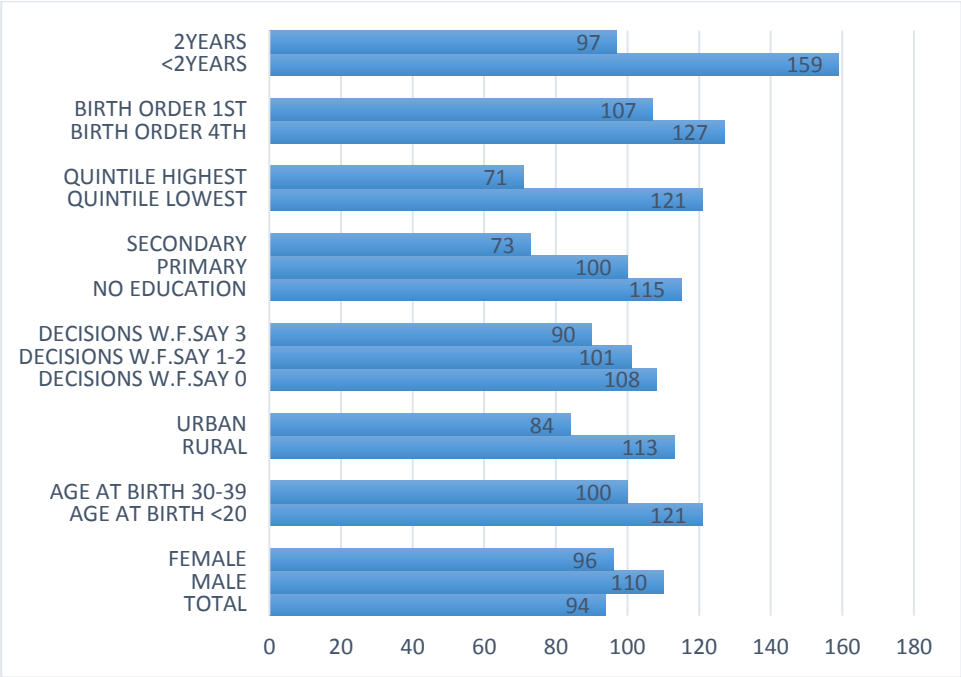


Figure 5.9 Under five mortality rate by sex, mother's age at birth, residence, mother's participation in decision making and education, wealth quintile birth order and birth interval
Data source: Demographic Health Surveys (various years)

Figure 5.10 depicts underweight children by residence, sex, size at birth, birth interval, mother's education and nutritional status.

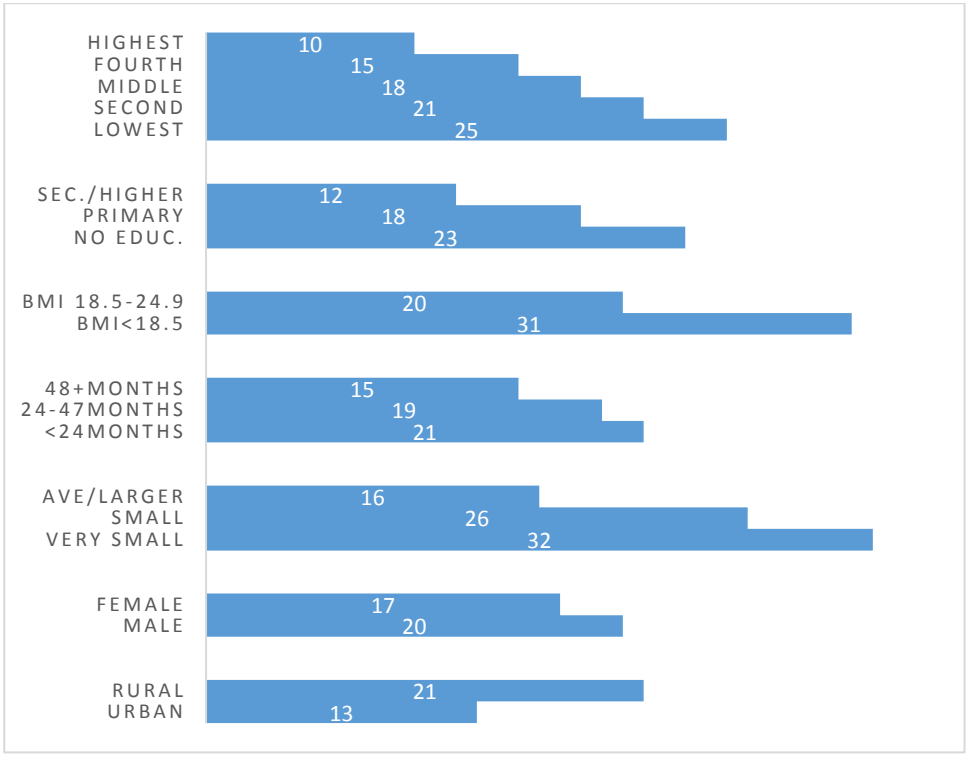


Figure 5.10 Underweight children in % by residence, sex, size at birth, birth interval, mother´s education & nutritional status and wealth quintile. Data source DHS (Various years) Note: World Health Organization (WHO) uses Body Mass Index (BMI) to measure a person's weight

relative to their height. BMI= weight (kg) / height (m), < 18.50 – underweight, 18.50 - < 25.00 normal, range 25.00 - <30.00 overweight excluding obesity

Source: Eurostat website 2016.

It is evident in figure 5.10 that the highest percentage of underweight children are those who are born very small (32%), followed by mother's nutritional status, mothers with body mass index below 18.5 accounted for 31% of the underweight children. Mothers without education had 23% of underweight children in comparison to mothers with secondary or higher levels of education who had 12% of underweight children.

While rural children are largely underweight as compared to urban children, underweight children from the lowest wealth quintile are more than double the percentage of those from the highest wealth quintile. Low birth interval positively contributes to the high percentages of underweight children in comparison to high birth interval for instance 21% of underweight children were born with less than 24 months' birth interval while 15% of underweight children were those born with a birth interval of 48 months and over.

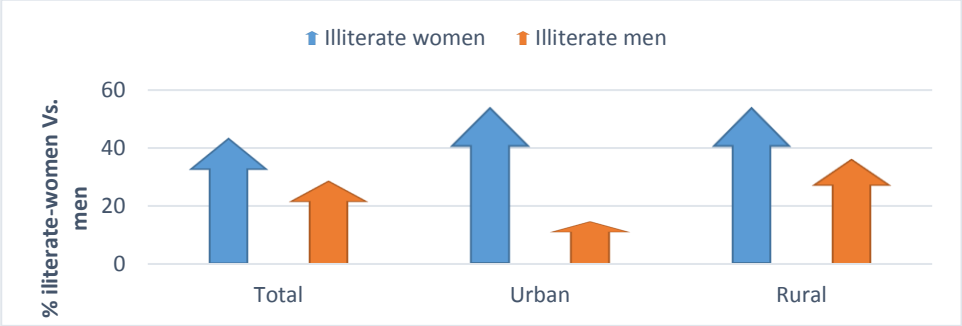


Figure 5.11 Comparison of % averages of illiterate women and men by residence

Figure 5.11 reports a high concentration of illiteracy rates in rural areas and among women in comparison to urban areas and among men. In the 2000s Lesotho, had not only the lowest female illiteracy rate of 2.9%, but it was also the only country under observation with more literate women than men, while Chad had the highest percentages of illiterate men and women to the tone of 64.5% and 87.9% respectively. The gap between African illiterate urban women and men is very wide, 54.2% for women and 14.5% for men. The gap between African illiterate rural women and men is 54.2% and 36.3% is not remarkably higher in comparison to the urban gap.

Women's access to land

As much as the findings of the foregoing subsection point to the important role of mother's education in child poverty variables like U5MR and CU, mother's all important role in children's wellbeing can only be effective if respective institutions work together in harmony towards the improvement of the status of women. For instance, reformation of land laws should uphold gender equity in land rights across the entire legal framework, from the constitution to civil and family laws; customary norms and practices should be addressed parallel to the legal framework. Results not shown reveal that of all the countries under observation, only Niger has more than 15% of its women owning land, the rest of the countries have women's land ownership below 15%, with some like Gambia, Nigeria and Togo have 5% and below.

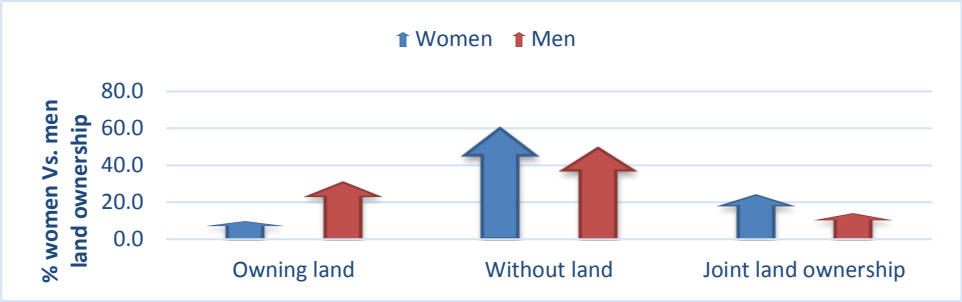


Figure 5.12 % Gender inequality in land ownership
Data source Demographic Health Survey (Various years)

Figure 5.12 shows very wide differences in higher percentages of men owning land than women, more women with joint land ownership as compared to men. It should be noted that DHS data we are using is from interviews and does not always total to 100%. For instance, the totals of both men and women in figure 5.14 above does not amount to 100%.

Women's access to credit

In Sub Saharan Africa, there is generally gender inequality in accessing credit, largely because most women fail to fulfil the requirements of accessing credit in large formal banks. However, microfinance institutions' (MFI) lending requirements enable some women to access them. Microfinance institutions across Sub Saharan Africa fall into five categories- microfinance banks, rural banks and community banks, cooperative networks, Non-Governmental Organisation MFI and non-banking financial institutions.

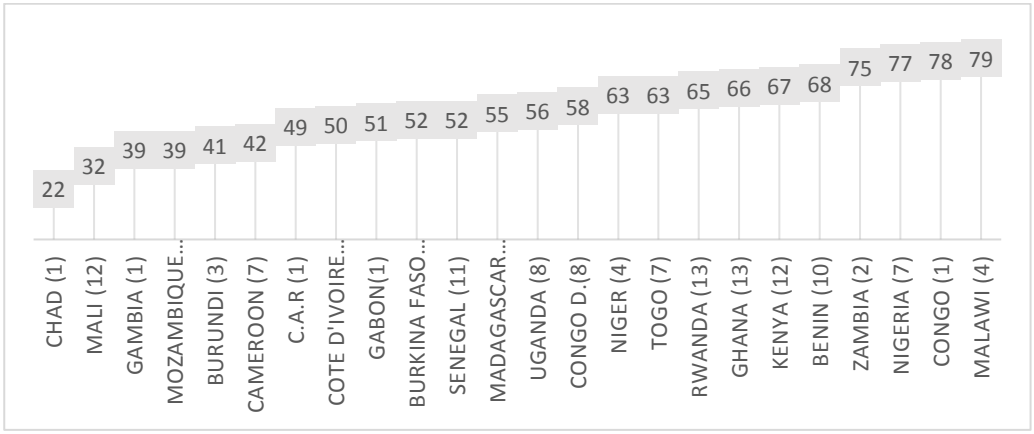


Figure 5.13 % of women borrowers from micro finance institutions across Sub Saharan African countries
Source: Helmore Kristin (CARE 2009)

Figure 5.13 shows the percentage of women borrowing from microfinance institutions across Sub Saharan Africa. The numbers in brackets represent the number of microfinance institutions in respective countries in 2007 (Helmore Kristin 2009). The wide disparity in percentages of women borrowers from MFI ranges from as low as 22% in Chad which had only one MFI in 2007 to 79% in Malawi which had four MFI in 2007. The figure suggests that the percentage of women borrowers is not in proportion to the number of MFI. For instance, in 2007, Madagascar had the highest number of MFI (17), but had only 55% women borrowers. Microfinance lending institutions services include savings, insurance, larger loans for business investment and flexibility of loan payment. Their services are more accessible to rural women because they charge lower

interest rates than money lenders and in addition to this, they mostly replace collateralized loans with peer supported guarantees of group lending. However as much as MFI terms and requirements are more accessible than other formal banking institutions, they still fail to reach out to the remotest rural areas of Africa, which are mostly inaccessible due to lack of infrastructure.

Women's status examined through their access to job market

There is a great gender inequality in skilled labour at all levels of education as well as in terms of wealth quartiles. The same conclusion can be drawn for unskilled manual work. The only occupation with higher percentages of women at all levels as compared to men is in household and domestic occupations. Higher education narrows the gender inequality gap only in professional, technical and managerial occupations. These findings suggest that besides education, there are other factors that largely contribute to high gender inequality in the labour market. Although, a majority of rural women are employed in the agricultural sector, gender inequality is at work in all the categories as shown in figure 5.14, with the exception of the highest wealth quartile where the difference is minimal.

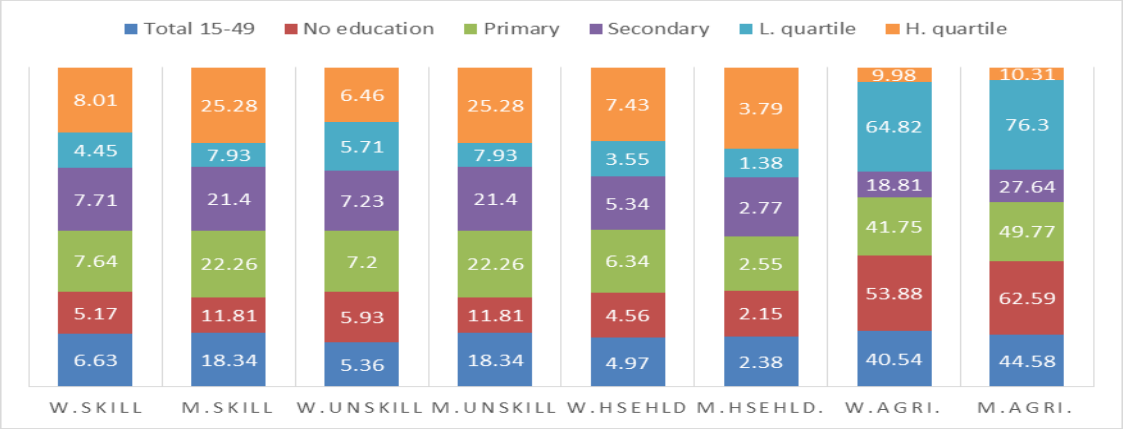


Figure 5.14 % of gender inequality in the labour market by education level and wealth quartile

Note: W. skill and m. skill is female and male skilled labour, w. unskill and m. unskilled is female and male unskilled labour, w. HSEHLD and m. HSEHLD is female and male engaged in domestic labour and; w. agri. and m. agri. is female and male engaged in agricultural labour.

Figure 5.14 portrays gender inequality in the labour market at a glance of female and male ages 15-49, with no education, with primary and secondary education and; wealth quartile.

Women's status examined by assessing women who are unable to access health facilities by residence, wealth quintile and employment status.

Figure 5.15 shows women's low status by their lack of access to health services due to different reasons.

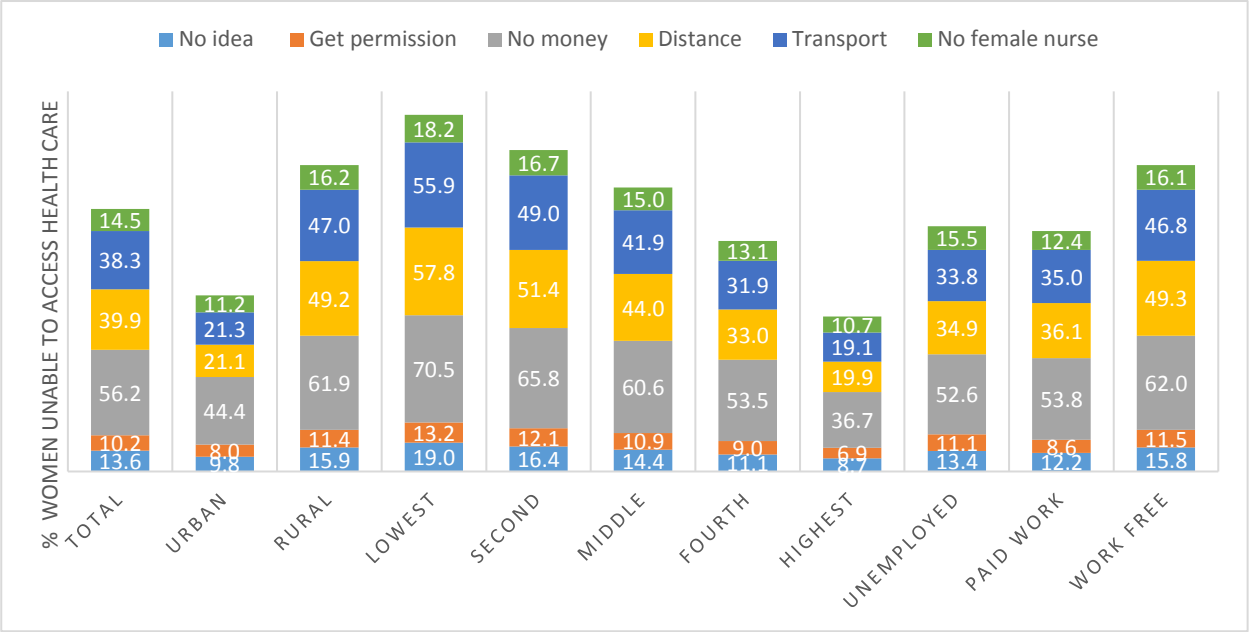


Figure 5.15 % women across Sub Saharan Africa who are unable to access health facilities by residence, wealth quintile and employment status. Data source Demographic Health Survey (Various years)

Figure 5.15 reveals that 56.2% of the women reported lack of money as the main reason for not accessing health facilities. 39.9% of the women miss out on receiving health services due to the long distance to the nearest health facility, while 38.3% reported lack of transport due to poor infrastructure to facilitate their access to the health centre. Other factors such as lack of knowledge about the health centre, the need to get permission from their husbands and the health facility not having female personnel all scored below 15%. Over 15% of rural women from the lowest and second wealth quintile; and those that work for free had no information about health facilities. Over 10% of rural women from the lowest, second, and middle quintiles; the unemployed women and those that work for free had to get permission from their husbands before going to a health centre. Over 50% of women belonging to all the groups with the exception of urban women and those from the highest wealth quintile reported money as the reason for not attending health centres. In all the groups, over 25% of the women had problems of accessing the health services due to distance and transport issues with the exception of urban women and those from highest wealth quintile. Between 10% and 18.2% of the women in all the groups did not make use of the services of the health facility because there were no female personnel to attend to them.

5.6 Conclusion of descriptive analysis of factors affecting child poverty

Children living in poverty have been identified following the deprivation approach (Gordon et al. 2003b), which establishes a set of basic services and capabilities to measure the children who have no access to the basket of services and capabilities. Results in Figure 5.1 show that the highest percentage of children deprived of basic capabilities in Africa are found in the area of shelter and sanitation. The percentages of children deprived of education indicated by OOSC are much higher than what is shown in Figure 5.1, if OOSC of preschool age are included. There is a tendency for multiple interdependencies among child poverty variables, and PCA statistical technique has been applied to investigate the pattern of correlation with the objective of

identifying and weighting the most important indicators. Results of PCA have found several factors associated with low status of women as important variables affecting child poverty. The identified variables are breastfeeding and complementary food, women with final say in social networking, wife earns less than husband, couples' joint decision in the use of wife's earnings, thin women's BMI, women who are literate, birth intervals 24-35 months, birth order, skilled antenatal care, skilled birth attendant, women with access to credit, women without land, women who own a house.
Biplot shows a positive correlation between women's access to credit and IIAG because their access to credit implies that the institutions have created an enabling environment for them to utilize credit facilities. The variable of women with no land is negatively correlated to IIAG because good institutional quality has gender equality rules in place which will eventually reduce the number of women without land. Women without land is negatively correlated to women with credit, because the lack of collateral such as land is one of the major reasons why women fail to access credit.

The first principal component of data for over a one year period is heavily loaded by IIAG (-0.91), the other variables loaded on this component are the U5MR, GPI, did not like school and got married. It can be said that the first component is primarily a measure of IIAG, because it is heavily loaded by it. The relationship between IIAG and other variables that have been loaded on the first component suggests that poor institutional quality increases the percentage rates of the U5MR, children dropping out of school to get married or because they did not like school. Gender disparity in primary school enrolment (low status of women) in the first component increases child mortality and school dropout. The second component, named women's access to credit, is loaded heavily by stopped schooling because did not pass exams and women with access to credit. These two factors are related because if a mother lacks access to credit, her financial opportunities are limited, and this may negatively impact the school performance of her children.

The results of country scores from PCA were used with the help of agglomerative hierarchical clustering to cluster countries into three groups. Countries in the first cluster have the highest percentage of malnourished women, literate women and women with higher education; households with a radio, unprotected water and without toilet facilities. The second cluster consists of factors such as women giving birth by age 15, wife earns less than husband, OOSC, U5MR, CU, birth order 5+ and lowest wealth quintile. Child poverty reducing factors in this cluster are having a skilled birth attendant, birth interval 24-35 months, households with a mobile phone and children with birth certificates. The third cluster displays child friendly characteristics such as high percentages of breastfeeding and complementary foods, school attendance orphans aged 10-14, primary school enrolment and DPT_3 vaccination. This cluster is also characterized by women friendly variables like women's final say in social networking, women in agriculture, couple's joint decision on the use of wife's earnings, gender parity index and skilled antenatal care. The success of this cluster can partly be attributed to high percentages of IIAG (good institutional quality).

Results based on country quartiles of % averages of factors affecting child poverty suggest that the fourth quartile has the highest percentages of school attendance by orphans, couple's joint decision on the use of wife's earnings, IIAG, primary school enrolment, and skilled antenatal care; and lowest percentages of U5MR, thin women BMI (<18.5), birth order 5+ and population without toilet. Results based on country quartile of averages of factor scores of factors affecting child poverty indicate that countries in the first and second quartiles have negative scores on the first component suggesting that they have a lower percentage of children receiving breastfeeding and complementary foods and percentage of orphans attending school. Conversely, countries in the third and fourth quartiles show a positive impact in increasing percentages of breastfeeding and complementary foods as well as orphans attending school. A comparison of country quartiles by % averages of the variables and country quartile by factor scores shows that the fourth quartile has better child poverty results suggesting that women giving birth by age 15, breastfeeding and complementary foods; and orphan school attendance are important socioeconomic indicators of child poverty since these countries were clustered according to the factor score of the first component which was loaded by the variables in question.

There have been declining rates in school attendance. The reasons contributing to children being out of school are mostly poverty (lack of school fees), dislike of school and poor performance in exams. There is a remarkable difference between U5MR of mothers with no education (115) and that of mothers with secondary education (73). The U5MR are higher in households where women have no final say in decision making (108) as compared to households where women have a final say in at least three decisions (90).

It is evident that the highest percentage of underweight children are those who are born very small (32%), followed by mother's nutritional status, mothers with body mass index below 18.5 accounted for 31% of the underweight children. Mothers without education had 23% of underweight children in comparison to mothers with secondary or higher education who had 12% of underweight children. Results report a high concentration of illiteracy rates in rural areas and among women in comparison to urban areas and among men. Results not shown reveals that of all the countries under observation, only Niger has more than 15% of its women owning land, the rest of the countries have women land ownership below 15%, some like Gambia, Nigeria and Togo have rates of 5% and below. There are considerable differences in the percentages of men owning land than women, more women with joint land ownership as compared to men. There is great gender inequality in skilled labour at all levels of education as well as in terms of wealth quartiles. The same conclusion can be drawn for unskilled manual labour. These findings suggest that besides education, there are other factors that largely contribute to high gender inequality in the labour market. The wide disparity in percentages of women borrowers from MFI ranges from as low as 22% in Chad which had only one MFI in 2007, to 79% in Malawi which had four MFI in 2007.

6. RESULTS AND DISCUSSION

" On a purely economic basis it makes a lot of sense to invest in the young.....early learning begets later learning. And early success breeds later success" James J. Heckman, PhD. Nobel Prize Laureate Economist.

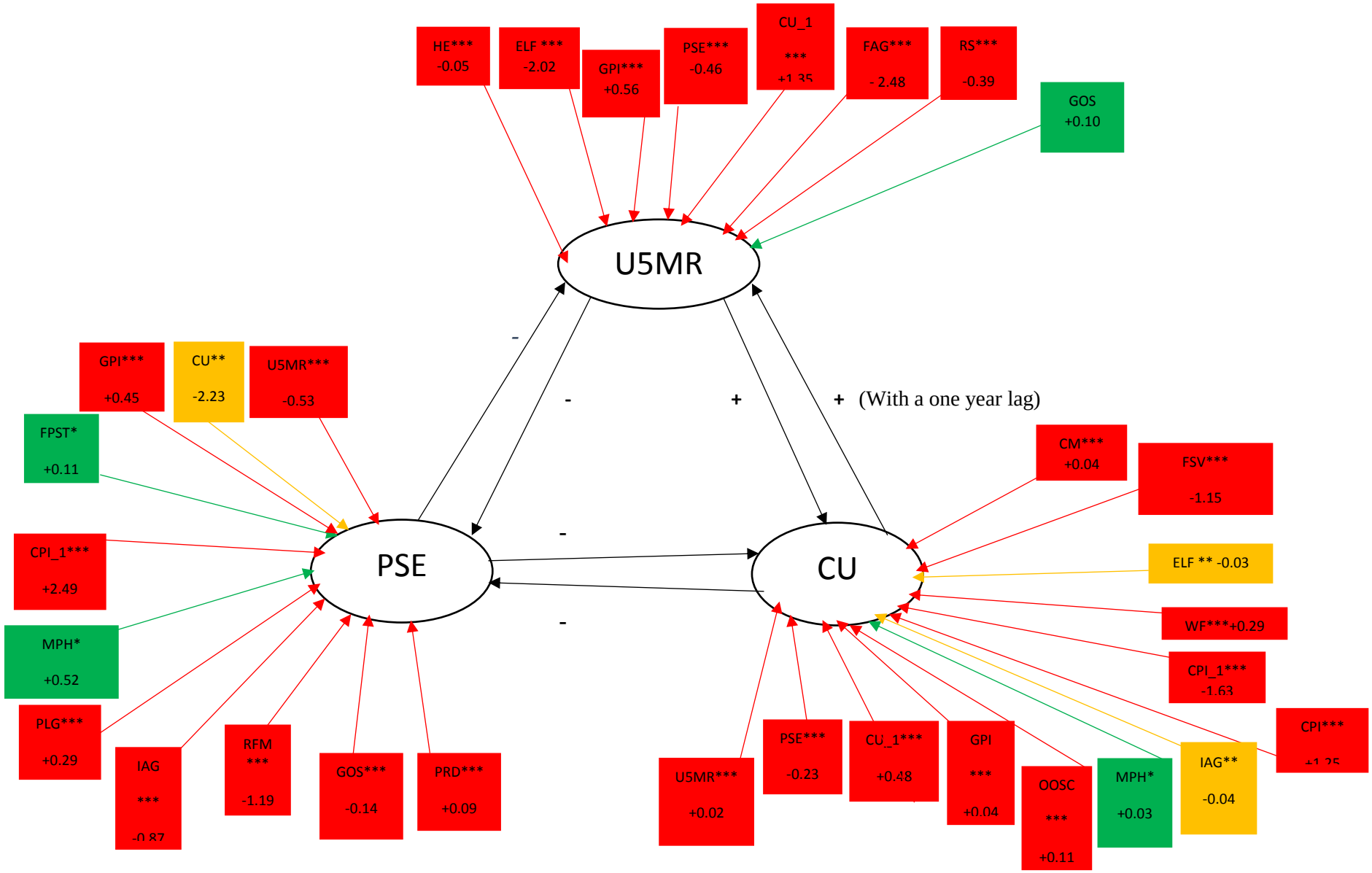
In reporting the results of the effect of primary school enrolment (PSE) on both under-five mortality rate (U5MR) and child underweight (CU), the effect of U5MR on both PSE and CU, and the effect of CU on both PSE and U5MR, every estimated coefficient can be explained by holding other variables fixed in terms of their effect on the dependent variable. Results are presented in Table 6.1, while Figure 6.1 provides graphical representation of the empirical effects in terms of elasticity measures and the significance levels. The importance and causality of the variables being estimated has been explained in the conceptual framework (Chapter 3) and thus will not be repeated here in reporting the results.

6.1 Estimates of factors affecting child poverty

Table 6.1 ESTIMATES OF FACTORS AFFECTING CHILD POVERTY

VARIABLE	COEFFICIENT	STD ERROR	T-STAT	P-VALUE	ELASTICITY
EQUATION 1: DEPENDENT VARIABLE-UNDER FIVE MORTALITY RATE 1990-2010					
Constant	76.0533***	13.4750	5.64	0.0000	
Primary school enrolment (PSE)	-0.0896***	0.0164	-5.44	0.0000	-0.46
Child underweight_1 (CU_1)	0.7604***	0.0433	17.56	0.0000	1.35
Gender parity index (GPI)	0.0948***	0.0214	4.42	0.0000	0.56
Female employment in agriculture (FAG)	-0.5489***	0.1265	-4.34	0.0000	-2.48
Agricultural value added (AGV)	-0.0004***	0.0001	-3.83	0.0001	-0.00
Health expenditure per capita (HE)	-0.1306***	0.0369	-3.53	0.0004	-0.05
Rural sanitation (RS)	-0.2146***	0.0596	-3.60	0.0003	-0.39
Ethnolinguistic fractionalization (ELF)	-0.4178***	0.0648	-6.44	0.0000	-2.02
Girls out of school (GOS)	0.0310	0.0191	1.62	0.1054	0.10
Country dummy-West Africa (WA)	-0.0680**	0.0300	-2.27	0.0234	
Number of observations	630	Durbin - Watson test		2.325	
EQUATION 2: DEPENDENT VARIABLE- PRIMARY SCHOOL ENROLMENT					
Constant	183.653**	87.9421	2.09	0.0368	
Under five mortality rate (U5MR)	-2.6917***	0.3710	-7.25	0.0000	-0.53
Child underweight (CU)	-6.4803**	3.3039	-1.96	0.0498	-2.23
Gender parity index (GPI)	0.3678***	0.1067	3.45	0.0006	0.45
Crop production index_1 (CPI_1)	1.9541***	0.3034	6.44	0.0000	2.49
Roads, paved (PRD)	0.2822***	0.0461	6.12	0.0000	0.09
Persistence to last grade of primary (PLG)	0.3550***	0.0746	4.76	0.0000	0.29
Ratio of female to male labor F.P. rate (RFM)	-1.0215***	0.2022	-5.05	0.0000	-1.19
Children in employment (CL)	-0.0003***	0.6912	-4.31	0.0000	-0.00
Girls out of school (GOS)	-0.2161***	0.0729	-2.96	0.0030	-0.14
Ibrahim's Index of African Governance (IIAG)	-1.1841**	0.5397	-2.19	0.0282	-0.87
Orphans 0-17yrs currently living (ORP)	-0.0016*	0.8487	-1.84	0.0660	-0.00
Female teacher primary school (FPST)	0.1793*	0.1029	1.74	0.0814	0.11
Mobile phone subscribers (MPH)	1.0197*	0.5271	1.93	0.0530	0.52
Country dummy-Southern Africa (SA)	-0.3326***	0.0816	-4.07	0.0000	
Country dummy-West Africa (WA)	-0.3582***	0.1230	-2.91	0.0030	
Number of observations	630	Durbin Watson test 2.149			
EQUATION 3: DEPENDENT VARIABLE CHILD UNDERWEIGHT					
Constant	24.8681***	3.7269	6.67	0.0000	
Child underweight_1 (CU_1	0.4841***	0.0691	7.01	0.0000	0.48
Under five mortality rate (U5MR)	0.0332***	0.0119	2.79	0.0053	0.02
Primary school enrolment (PSE)	-0.0840***	0.0277	-3.02	0.0025	-0.23
Gender parity index (GPI)	0.0059***	0.0016	3.68	0.0002	0.04
Crop production index (CPI)	0.3309***	0.0611	5.41	0.0000	1.25
Crop production index_1 (CPI_1)	-0.4375***	0.0668	-6.54	0.0000	-1.63
Enrolment in sec. vocational, female (FSV)	-0.7144***	0.1880	-3.80	0.0001	-1.15
Wood fuel (WF)	0.6085***	0.1668	3.65	0.0003	0.29
Child marriage (CM)	0.0039***	0.0013	2.83	0.0047	0.04
Out of school children (OOSC)	0.0829***	0.0285	2.91	0.0036	0.11
Married women can open bank acc. (MWBA)	-0.0021**	0.0009	-2.27	0.0233	-0.00
Ibrahim's Index of African Governance (IIAG)	-0.0207**	0.0109	-2.06	0.0394	-0.04
Ethnolinguistic fractionalization (ELF)	-0.0109**	0.0051	-2.13	0.0334	-0.03
Mobile phone subscribers (MPH)	0.0186*	0.0098	1.09	0.0576	0.03
Regional dummies, West Africa (WA)	-0.0046**	0.0019	-2.37	0.0177	
Regional dummies, Southern Africa (SA)	-0.0024	0.0016	-1.56	0.1191	
Number of observations	630	Durbin Watson test		2.037	

The numbers in parentheses below the estimated coefficients are absolute values of the "t" ratios. Three asterisks, two asterisks and one asterisk besides the estimated coefficients denote statistical significance at 0.01, 0.05 and 0.10 levels respectively valued at two-sided test. All the variables are in percentages, with the exception of regional dummies and married women with access to bank account which is a dummy variable.


HE*** -0.05
ELF *** -2.02
GPI*** +0.56
PSE*** -0.46
CU_1 *** +1.35
FAG*** - 2.48
RS*** -0.39
GOS +0.10
U5MR
-
-
+
+ (With a one year lag)
GPI*** +0.45
CU** -2.23
U5MR*** -0.53
FPST* +0.11
CPI_1*** +2.49
MPH* +0.52
PLG*** +0.29
IAG *** -0.87
RFM *** -1.19
GOS*** -0.14
PRD*** +0.09
PSE
CU
-
-
CM*** +0.04
FSV*** -1.15
ELF ** -0.03
WF***+0.29
CPI_1*** -1.63
CPI*** +1.25
IAG** -0.04
MPH* +0.03
OOSC *** +0.11
GPI *** +0.04
CU_1*** +0.48
PSE*** -0.23
U5MR*** +0.02

Note: represents 1% significance represents 5% significance represents 10% significance

Three asterisks, two asterisks and one asterisks besides the variables denote statistical significance at the 0.01, 0.05 and 0.10 levels respectively. While the numbers below the variables denote elasticity values.

Figure 6.1 Estimated coefficients of factors affecting child poverty depicted with "t" ratios represented in asterisks and elasticity in numbers

The results of the estimated coefficients of the factors affecting child poverty based on the three stage least squares (3SLS) estimation in Table 6.1 have the expected signs and are mostly statistically significant. In equation 1, the benefits of education in reducing child poverty (under-five mortality rate[6]) are evident through the estimate of primary school enrolment which is statistically significant at 0.01 level. Furthermore, the estimated elasticity[7] indicates that a 1% increase in primary school enrolment will lead to a decrease in U5MR by 0.46%. The variables representing women's status in equation 1 are female employment in agriculture, gender parity index and girls out of school. The gender parity index, (GPI) a proxy for the low status of women has a positive effect on U5MR whereas improved status of women has a negative effect on U5MR. In the present context, the low status of women connotes not having equal access to education as compared to men. Regression results reveal that the gender parity index is positive (0.09) and statistically significant at the 0.01 level of significance. Furthermore, the estimated elasticity indicates that a 1% decrease in the number of girls enrolled in primary school as compared to the number of boys will increase child mortality by 0.56%. The benefits of girls' education in terms of reducing child poverty have been explained in earlier chapters. For instance, among other things, educated women are known to have good health practices such as controlling fertility rates, good nutrition and good hygiene practices that boost children's wellbeing and performance at school which translates into better future prospects in adult life, thereby minimising intergenerational child poverty. The child's perspective approach in Table 2.1 of Chapter 2 shows that 75% of the children interviewed rated education as one of the three most relevant capabilities in a child's life. Since this study is partly founded on children's views, education variables such as primary school enrolment, girls out of school and gender parity index are used as explanatory variables to gauge the impact of education on child poverty. To what extent can lack of access to education (PSE) cause child poverty (U5MR) or how strong is the impact of education on child poverty?

It is generally assumed that lack of access to education leads to higher poverty levels, whereas education tends to reduce poverty levels, but what is the corresponding elasticity? Results of education elasticity of child poverty in both Table 6.1 equation 1 and Figure 6.1 indicates that education can reduce child poverty to a large extent. Primary school enrolment is significant in reducing child poverty, while gender parity index (the low

[6] Under-five mortality throughout this study is a proxy for child poverty, and reasons for this were explained in Chapter 4.

[7] Measurement of elasticity: Each coefficient is multiplied by the ratio of the data mean of the independent variable to the dependent variable.

ratio of girls' to boys' primary school enrolment) is significant in increasing child poverty therefore the null hypothesis is rejected at 0.01 level, while with girls out of school, the null hypothesis is rejected at 0.10 level.

The findings of this study on the impact of primary school enrolment on child poverty are similar to those of Barro and Lee (2010) who used average years of schooling to show how much countries lose by not investing heavily in primary school education. The report shows that Sub Saharan African countries like Mali with 2.03 average years of primary schooling loses 83.8% of GDP per capita, while Democratic Republic of Congo with 3.47 average years of primary schooling loses 43.3% of GDP per capita and Cote d'Ivoire with 4.5 average years of primary schooling loses 22.2% of GDP per capita. Burnett et al. (2013) reveals calculations of the forecasted foregone income of today's OOSC of selected Sub Saharan African countries – in Cote d'Ivoire, failing to complete primary school leads to an income loss of 29%, losses of wage premium to primary education of 15% and direct costs as a percentage of GDP per capita of 4.3%. For the Democratic Republic of Congo, losses are- 12%, 9% and 1.1%, while Mali's are 33%, 9% and 2.9% respectively. UNESCO (2012) reports that education makes people more skilled and employable and at the same time provides an escape route from poverty, an additional year of education adds about 10% to a person's income on average. Nielson (2006) reports that primary education has a direct positive impact on future earnings and on agricultural productivity; it also increases health as well as reduces poverty.

Psacharopoulos and Patrinos (2002) found that social returns from primary education are much higher than those from secondary education, particularly in low income countries as compared with high income countries. Social returns from primary education in high, middle and low income countries are 13.4%, 18.8% and 21.3% respectively, while social returns from secondary education in high income countries are 10.3%, middle income 12.9% and low income 15.7%. They report that private returns from primary education are far higher than social returns and that private returns from primary education are higher than private returns from both secondary and higher education, this pattern is common to low, middle and high income countries.

However, our findings are contrary to those of Faux and Ntembe (2013) who investigated the impact of primary education attainment on poverty in Cameroon, and found that primary education had no impact on poverty reduction, but added that as education level rises, it negatively affects poverty. Appleton (2000) review of nine African studies concluded that the estimated effects of education were typically insignificant. He found that a mean increase in self-employment income associated with an extra year of education is 7% at primary level and 12% at the secondary level.

Our findings on the importance of female education are similar to those reported by Smith and Haddad (2000b), who found that in Mozambique, increasing the number of adult females that complete primary school in each household by 1% leads to a 23.2% decrease in the proportion of the population below poverty line. Also, an additional year of education leads to 3-14 % increases in wages and productivity.

Preschool education is crucial for the development of a child's cognitive skills. Results on the estimated coefficient on preschool enrolment not reported show a low statistical and economic significance in explaining child poverty. Among the reasons could be the fact that generally in Africa, the percentage of children enrolled in preschool tends to be low and at the same time, there is a wide disparity in preschool enrolment rates across Africa as evidenced by the descriptive statistics in Chapter 5. The importance of preschool education is evidenced by the findings of Aguilar and Tansini (2010) who investigated the link between preschool and schooling outcomes and found that 22% of pupils who had pre-schooling passed their 6th year with grades above very good, as compared to only 3% of those who did not have pre-schooling. Berlinski et al. (2007) studied the effect of preschool education on children's subsequent school outcomes and found small gains from preschool attendance at early ages but these were magnified as children grew up. They report that by age 15, children will have accumulated 0.8 extra years of education and are 27 percentage points more likely to be at school compared to the children who have not attended preschool.

In addition to education variables for explaining child poverty, we turn to other variables that affect child poverty. The explanatory variables representing social-cultural and political institutions in explaining child poverty are the gender parity index (already explained), ethnolinguistic fractionalization (ELF) which is used as a proxy for both women's access to credit and the quality of institutions (highly fractionalized societies are assumed to affect the quality of institutions); and female employment in agriculture represents rural household income and the important role rural women play in agriculture in the reduction of child poverty. The low status of women in the present context connotes women not having equal access to credit as well as other productive resources as compared to men.

Female employment in agriculture has a statistically significant negative effect (-0.54) on child poverty; the null hypothesis of the factors that determine the low status of women having a positive effect on child poverty is rejected at the 0.01 level. Furthermore, the estimated elasticity shows that a 1% increase in the number of women employed in agriculture will decrease child poverty by 2.48%. ELF represents women's groups. As explained elsewhere in this study, rural women face great challenges in accessing productive resources, but women's groups are partly helpful in these challenges because women generally tend to get social support in terms of credit and valuable information as regards economic and social issues from these groups. The estimate ELF is negative (-0.42) and statistically significant at the 0.01 level, the estimated elasticity indicates that a 1% increase ELF, will reduce child poverty by 2.02%.

ELF is correlated with nearly all the variables in equation 1, but its effects are particularly felt in rural areas where people's attitudes and interaction in the community have a lot to do with the prevailing socio-cultural norms. For instance, the gender parity index and girls out of school will depend on the importance the ethnic groups attach to women's education. It is common in Africa to find people from specific ethnic groups with high education levels while some ethnic groups hardly have any secondary school graduates. ELF can either have a positive or negative effect depending on the interests of different communities. Ethnic diversity is often

associated with a negative effect on the provision of education and on development in general particularly in highly ethnic diversified societies (affects quality of institutions). However, it should be noted that social networks and associated norms that have a positive effect on community productivity and wellbeing increase productivity by reducing the costs of doing business, and by facilitating coordination and cooperation. Therefore, in the present case, the effect of ELF reducing child poverty has turned out to be stronger than ELF's negative effect on institutional quality that increases child poverty.

The estimated coefficient of child underweight has a one year lag, for it does not always follow that the effects of poor health will affect economic status immediately leading to poverty. Similarly, just because a child is underweight does not mean they will die on the spot; there is a time lapse before the negative effects are felt. Child underweight significantly increases U5MR (0.76) and is statistically significant at the 0.01 level. The estimated elasticity indicates that a 1% increase in child underweight will increase U5MR by 1.35%. The public health literature suggests that the considerable influence of under-nutrition on child mortality is due to the fact that under-nutrition increases the susceptibility to and severity of illness. The empirical literature on these linkages is not strong, probably due to the lack of social-economic data in most of these studies, or the lack of large representative panel data sets. These shortcomings have led to debates on the size of the influence of childhood under-nutrition on child mortality. Klasen (2007) suggests that 60% of childhood deaths are directly or indirectly attributed to moderate or severe under-nutrition. Most micro-level empirical evidence suggests some negative effects of moderate under-nutrition and clearly identifies high morbidity and mortality risks to severe under-nutrition.

Agricultural value added and total health expenditure are explanatory variables pertaining to economic institutions in explaining factors affecting child poverty. Agricultural value added is found to play an important role in child poverty; it is statistically significant at the 0.01 level but with nearly zero elasticity of child poverty. Health expenditure is negative (-0.13) and statistically significant at the 0.01 level, furthermore the estimated elasticity indicates that a 1% increase in health expenditure will reduce U5MR by 0.05%.

The estimated coefficient of rural sanitation is of great importance in explaining the causes of child poverty. The table of descriptive statistics in Chapter 5 depicts that rural sanitation ranges from 1 to 88 with a mean of 25. These statistics imply that rural Sub Saharan African sanitation conditions are deplorable, and a large majority of the population hardly have any form of acceptable sanitation. This deplorable condition positively contributes to increases in U5MR, for example, the estimate of rural sanitation is negative (-0.21) and statistically significant at the 0.01 % level. The estimated elasticity shows that 1% increase in rural sanitation decreases U5MR by 0.39%.

The literature review for this study in the section on water and sanitation reported that the high dropout rates of girls from schools is largely due to inadequate sanitation and water supply. The literature review also pointed out that in a majority of Sub Saharan countries, budget allocations as a percentage of GDP to water and

sanitation is quite low (as low as 0.5% of GDP). Also, Figure 5.1 in Chapter 5 showed that about 67% of the Sub Saharan African population are deprived of good sanitation facilities.

Equation 1 has attempted to answer the question that children are poor because they cannot access education, whereas equation 2 attempts to answer the reverse question about whether children lack access to education because they are poor. This question suggests that the causality between child poverty and lack of education is bi-directional. In the light of this understanding, equation 2 uses primary school enrolment as a dependent variable, while U5MR is used as an explanatory variable to gauge its negative impact on education and also to demonstrate that since causes of child poverty are interrelated, factors that positively affect child poverty negatively impact children's education and vice versa.

There is a reverse causality between primary school enrolment and U5MR; primary school enrolment negatively affects U5MR, while U5MR negatively affect primary school enrolment. In equation 2, the estimate of U5MR is negative (-2.69) and statistically significant, the null hypothesis that U5MR has no effect on primary school enrolment is rejected at 0.01 level. The estimated elasticity indicates that a 1% increase in U5MR reduces primary school enrolment by 0.53%. Household income is not the only factor determining children's access to school. Dieltieno and Meng (2008) are also of this opinion, for they argue that absolute poverty (which refers to households living below a minimum necessary to sustain subsistence) on its own is not sufficient to account for South Africa's access or dropout patterns. For instance, they report that approximately 31.1% of South Africa's population lived below the poverty line in 2007, whereas the primary school enrolment rate in the same period was 96%. In the same breath, Hunter and May (2003) found that during the socio-economic shocks of 1999 in South Africa, 41% of the households were affected but only 3% of those households were constrained to remove one or more of their children from school.

We now turn to other factors affecting access to education. The regression results reveal that child underweight is negative (-6.48) and statistically significant at the 0.05 level. A child who is underweight is most likely to be either absent from school due to poor health or if he/she attends school, may end up performing poorly probably because he/she suffers from underdeveloped cognitive skills. The estimated elasticity indicates that a 1% increase in underweight children will decrease primary school enrolment by 2.23%, these results suggest that of all the determinants of primary school enrolment, great attention should be given to children's nutritional status because it shows the highest effect on primary school enrolment.

Child malnourishment is attributed to several factors such as child's health, mother's health and education status, family income, availability of food supply and the accessibility of food which largely depends on its affordability. Children from poor families who barely have subsistence income, tend to suffer from malnutrition because their families are unable to make food purchases. Therefore, it is assumed that an increase in crop production may reduce food prices, and in the process, enable poor families to access food. Crop production index is a proxy for food supply, the estimated coefficient of crop production index is positive

(1.95) and statistically significant at the 0.01 level. A mother with the opportunity to access food has a better probability of maintaining good health and giving birth to healthy children, who can be enrolled and retained in school. The estimated elasticity shows that a 1% increase in crop production index will increase primary school enrolment by 2.49%.

Children living in poverty tend to live in inaccessible remote parts of rural areas, far away from infrastructure. The estimate roads paved is positive (0.28) and statistically significant at the 0.01 level, and the estimated elasticity indicates that a 1% increase in paved roads in remote areas to facilitate transportation will increase children enrolled in school by 0.09%. Although paved roads may contribute to improved primary school enrolment rates, Bryceson et al. 2008 have pointed out that since poor families neither have motor vehicles nor the ability to pay for public transport, investment in paved roads is by no means sufficient to enhance mobility of the rural poor. We are of the same opinion and that is why we have applied multidimensional measurements of child poverty.

Estimated coefficients representing women's status in equation 2 are gender parity index, ratio of female to male labour force participation rate and girls out of school. Regression results show that the estimated ratio of female to male labour force participation is negative (-1.02) and is statistically significant at 0.01 level. In circumstances in which low household income constrains parents to limit the number of children they send to school, sociocultural factors tend to favour sons over daughters, thus lack of income acts as a strong case against girls being sent to school. Subsequently, girls denied education grow into illiterate adults which adds to the already existing barriers in the labour market. With the widening of the gap between the ratio of female to male labour force participation rate, the estimated elasticity indicates that a 1% decrease in the ratio of female to male participation in the labour market will reduce primary school enrolment by 1.19%.

The gender parity index has improved over the years in several Sub Saharan African countries. A number of countries have a relatively higher ratio of girls to boys enrolled at primary school, evidenced in section 4.4.4, Table 4.4 where summary statistics reveal the range from 40.93 to 100 with a mean of 84.45. The positive impact of the improved ratios is evident in equation 2, where the gender parity index is positive (0.36) and statistically significant at the 0.01 level. The estimated elasticity indicates that a 1% increase in the ratio of girls' to boys' primary school enrolment (gender parity index) may increase primary school enrolment by 0.45%. Women's status improves through the channel of increasing the ratio between girls' and boys' school enrolment; they subsequently increase the rates of primary school enrolment. Although the gender parity index positively impacts school enrolment, it does increase U5MR in equation 1, partly because of the low status of women in terms of making crucial decisions in their households. In cases where men make nearly all the decisions without involving women, such as the kind of food to be consumed and healthcare visits jeopardises children's wellbeing. It is the women who most of the time are the household managers and might have key information on the wellbeing of children.

The estimated persistence to the last grade of primary is positive (0.36) and statistically significant at the 0.01 level. This variable is important in trying to establish the quality and relevance of education, because if the quality is not good, not many pupils will persist to the last grade. For instance, some of the poor parents may be willing to keep their children at school if the quality of education is good and if it is relevant to the future labour market. Parents can gauge this by looking at the percentage of children enrolled in grade 1 who persist to the last grade. The estimated elasticity indicates that a 1% increase in the number of children persisting to the last grade increases primary school enrolment by 0.29 %.

Rural Sub Saharan Africa is largely characterised by poverty, and the effects of poverty are not only felt in families but also in schools. Therefore, the burden of developing schools particularly in poverty stricken areas is mostly borne by the African governments. The estimated coefficient of Ibrahim's Index of African Governance is negative (-1.18) and statistically significant at the 0.05 level. If the low proportion of education funds allocated to rural schools and poverty stricken areas in general diminishes, the estimated elasticity shows that a 1% decrease in Ibrahim's Index of African Governance will decrease primary school enrolment by 0.87%. The negative effect of African governance could be partly because there is a tendency to spend more in the tertiary sector as compared to the primary sector.

Rajkumar and Swaroop (2008) found a negative relationship between public expenditure and educational outcomes, but they associated the negative relationship to a lack of efficacy spending, not channelling resources to crucial areas in the education sector, probably due to corrupt practices. Their first results on the relationship between public spending on education and its impact on educational attainment were weak with the expected sign, but when they added corruption to control for the quality of governance, the public expenditure sign became negative. The effect of corruption on poor people can be gauged through its direct impact, such as increasing the cost of public services, lowering their quality, and restricting access to basic needs such as water, health and education. However, the indirect impact is the diversion of public resources away from social sectors thereby depriving children of their rights and in the process increasing child poverty. The study by Siddique et al. (2016), on the impact of governance and institutions on education and poverty alleviation in South Asian Association for Regional Cooperation (SAARC) economies found that governance had a positive impact on poverty and a negative effect on education because of poor government policies.

The estimated coefficients of regional dummies of Southern Africa and West Africa, are statistically significant with a negative sign. This suggests that the imbalance in the allocation of education spending between the primary and tertiary sectors, rural and urban areas, impoverished and affluent areas, goes beyond country level to regional levels.

To what extent does child poverty limit access to education? Figure 6.1 suggests that child poverty (U5MR) is significant in explaining the lack of access to education and the null hypothesis is rejected at the 0.01 level. These findings also apply to the gender parity index for which the null hypothesis is rejected at 0.01 level. A

high gender parity index improves the status of women which subsequently improves children's access to education. However, the crop production index has the highest effect on primary school enrolment: a 1% increase in the crop production index increases primary school enrolment by 2.49%. Child underweight takes the second position with 2.23% negative effect on primary school enrolment.

The findings from equation 1 suggest that child poverty can be reduced largely through improved status of women in agriculture. However, equation 2 explains that the increased crop production index increases primary school enrolment, whereas increased percentages of underweight children decreases primary school enrolment. Good health being a prerequisite for education brings us to equation 3. In equation3, we have used the dependent variable child underweight as an explanatory variable with a one year lag to control for autocorrelation. Women's status is represented by the gender parity index, female enrolment in secondary vocational education and married women can open a bank account. Estimated female enrolment in secondary vocational education is negative (-0.71) and is statistically significant at the 0.01 level. Female enrolment in secondary vocational positively impacts household economic conditions, household sanitation, family formation pattern and size of child at birth and in the process, will reduce the extent of child underweight. The estimated elasticity indicates that a 1% increase in female enrolment in secondary vocational will decrease child underweight by 1.15%. Smith et al. (2003) reported *that "women's status and the long-term and short-term nutritional status of children are linked. If men and women enjoyed equal status, child malnutrition in Sub Saharan Africa would decrease by nearly 3 percentage points—a reduction of 1.7 million malnourished children under three".* The study by Mahgoub et al. (2006) on factors affecting the prevalence of malnutrition among children under three years of age in Botswana found that the higher the level of mother's education, the lower the level of child underweight.

Wood fuel is a proxy for poor shelter which is normally associated with indoor pollution, poor sanitation and unsafe water. These poor housing conditions generally interact and in the process, reinforce diseases that both directly and indirectly negatively affect children's health. Thus, wood fuel is positive (0.60) and statistically significant at the 0.01 level. Wood fuel consumption may likely lead to increased indoor pollution which may harm a child's health, and a majority of poor families miss out on health services for reasons such as lack of information, being isolated from health centres and lack of money. A child's health may deteriorate and consequently increase the percentage of children who are underweight. The estimated elasticity indicates that a 1% increase in wood fuel consumption will increase child underweight by 0.29%.

The estimated coefficient of unlagged crop production index is positive (0.33) and statistically significant at the 0.01 level. The effects of crop production to reduce underweight children is not instant; time elapses before it takes effect. Thus, crop production without time lag has a positive effect on child underweight. The estimated elasticity shows that a 1% increase in crop production index may initially increase underweight children by

1.25%. However, with the lapse of time, a 1% increase in crop production[8] (one year lag) will decrease underweight children by 1.63%.

Child poverty limits the ability of children to access and obtain sufficient nutritious food, thereby their poverty state exacerbates their undernutritious status. Normally there is a tendency to associate underweight children with poverty for they mostly suffer from deprivation of food, particularly nutritious food. Estimated U5MR is positive (0.03) and is statistically significant at the 0.01 level. The estimated elasticity indicates that a 1% increase in child poverty, increases underweight children by 0.02%.

The estimated coefficient of the gender parity index is positive (0.01) and statistically significant at 0.01 level. Women's status significantly affects child nutrition because women with higher status are better cared for and provide higher quality care for their children. Studies have found that if women and men enjoyed equal status in Africa, child malnutrition in the region would decrease by nearly 3 percentage points, reducing the number of malnourished children under the age of 3 by 1.7 million (Smith et al. 2003). Conversely the low status of women in Africa positively affects child underweight, the estimated elasticity indicates that a 1% increase of women with low status will increase child underweight by 0.04%.

Primary school enrolment can reduce child underweight indirectly through the pathway of the benefits of education. Estimate of primary school enrolment is negative (-0.08) and is statistically significant at the 0.01 level. Primary school enrolment for instance may increase a mother's knowledge of healthy food and habits, provide better job options thereby increasing earning power to access health services, good housing and food. This may consequently reduce child underweight. The estimated elasticity indicates that a 1% increase in primary school enrolment will decrease child underweight by 0.23%.

Primary school enrolment can directly reduce child underweight through school feeding programs which enable poor children to have access to nutritious food which they would otherwise never have been able to access if they were not enrolled at school. OOSC are largely characterised by malnutrition, and school feeding programs may act as an incentive for children to enrol and remain at school. Estimated OOSC is positive (0.08) and statistically significant at the 0.01 level. Furthermore, the estimated elasticity shows that a 1% increase in OOSC will increase child underweight by 0.11%.

The estimated Ibrahim Index of African governance (IIAG) is negative (-0.02), and statistically significant at the 0.05 level. Conversely IIAG had a negative effect on primary school enrolment in equation 2. This turn of events does not necessarily imply that resources channelled to the health sector positively promote children's wellbeing. As with public expenditure on education, this case applies to healthcare as well. Resources are channelled mainly into tertiary healthcare which largely benefits richer people at the expense of primary

[8] Crop production index_1 is lagged because the initial and immediate impact of cultivating cash crops may positively affect the number of underweight children, while the lagged one has a negative effect.

healthcare which mostly benefits poorer people. The negative impact of IIAG on child underweight could be probably because of child vaccines such as DPT_3 which are easily accessible by poor families and greatly improve the chances of children not catching certain diseases that could have otherwise tamper with their health status and in the process, increase the percentage of underweight children.

Results of GDP per capita growth are not shown because we found an imperfect correlation between child underweight and GDP per capita growth. Vollmer et al. (2012 and 2014) found similar results, they reported that other explanatory variables such as mother's education, socioeconomic status, and poor mother's nutritional status have more impact on child's nutritional status than economic growth. Conversely, Biadgilign et al. (2016) found that economic growth substantially reduced child undernutrition, the majority of the sampled households were engaged in agricultural sector. Their results suggest that economic growth can reduce child poverty via agricultural productivity growth. Notwithstanding the fact that GDP per capita growth reduces child undernutrition, sustained GDP per capita will go a long way towards the goal of minimising child underweight. We thus apply variables that tend to accelerate the reduction of child underweight within a short time. However, the potential of the variables with direct negative effect on child underweight will most likely not have much impact, in the absence of economic growth. Results including the estimated coefficients of GDP per capita and price production index are reported in Appendix 1, Table 6.

To what extent can the low status of women be considered to be a contributing factor to child underweight? The estimated elasticity indicates that a 1% increase in female enrolment in secondary vocational education decreases child underweight by 1.15%. Whereas a 1% decrease in the ratio of girls' to boys' primary school enrolment (gender parity index) will increase child underweight by 0.04%. The positive effect of the gender parity index on child underweight can be explained partly by information in Chapter 5 that illustrated the importance of married women making joint decisions with their husbands on major household issues. The low status of women (GPI) is significant in explaining child underweight and the null hypothesis is rejected at 0.01 level. The effect of primary school enrolment on child underweight is modest. Education is significant in explaining underweight children and the null hypothesis is rejected at the 0.01 level. However, in addition to the foregoing variables in explaining child underweight, the explanatory variable in equation 3 with the greatest potency on child underweight is the crop production index; child underweight decreases by 1.63% for a 1% increase in crop production index

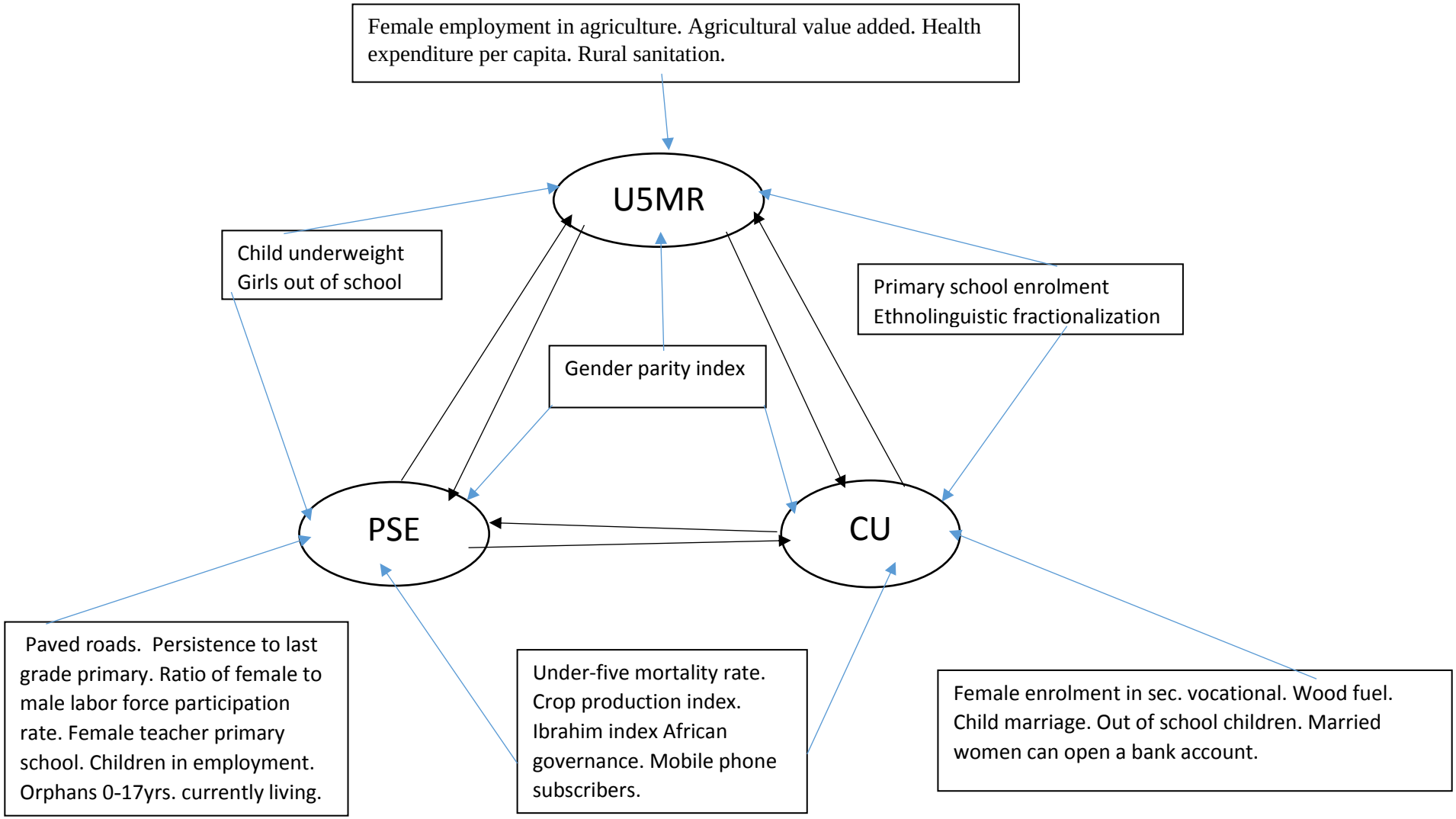


Figure 6.2 Factors affecting child poverty common to the three equation

Factors affecting child poverty common to the three equations

3SLS simultaneous equations were run on U5MR, PSE and CU endogenous variables. Figure 6.2 shows variables common to the three equations, variables shared between any two of the equations and variables unique to respective equations. At the centre of Figure 6.2 is the gender parity index, the only variable common to all three equations. The gender parity index is statistically significant in all three equations with a modest elasticity ranking both in U5MR and PSE but with minimal elasticity ranking in CU.

The new information that U5MR gives is the explanatory variables that are unique to it: female employment in agriculture, agricultural value added, health expenditure per capita and rural sanitation. All these explanatory variables are statistically significant with female employment in agriculture being the variable with the most potent impact on U5MR, while rural sanitation has modest potency in reducing U5MR. The left side of U5MR indicates that CU and girls out of school are common to both U5MR and PSE. Girls out of school performed better under PSE than U5MR, for in the former it has both statistical significance as well as modest potency on PSE. On the right side of U5MR, the variables common to U5MR and CU are PSE and ethnolinguistic fractionalisation (ELF). Both ELF and PSE have higher statistical significance under U5MR than under CU. ELF estimated elasticity of U5MR is -2.02% as compared to that of CU which is -0.03%. ELF lost most of its statistical significance in equation three on CU because of the presence of IIAG (institutional quality) since ELF is also a proxy for institutional quality.

The new information that PSE gives is the explanatory variables specific to it: paved roads, child labour, persistence to the last grade of primary, ratio of female to male labour force participation rate, female teacher primary school, children in employment and orphans 0-17 years currently living. Female teacher in primary school and orphans 0-17 years currently living have modest statistical significance, while the rest of the unique explanatory variables have high statistical significance. The explanatory variables common to PSE and CU are the U5MR, the crop production index, the Ibrahim Index African Governance and mobile phone subscription. Crop production index performed equally under both PSE and CU, while U5MR has performed far better under PSE than CU, whereas the Ibrahim Index African Governance has higher statistical significance under CU than PSE. The new information that CU gives is the explanatory variables that are unique to it: female enrolment in secondary vocational education, wood fuel, child marriage, OOSC and married women able to open a bank account. All these unique variables are statistically significant, with female enrolment in secondary vocational education having the greatest potency on CU. The explanatory variables that are common to CU and U5MR are primary school enrolment and ELF.

Conclusion

The results of all the estimated coefficients in Table 6.1 are mostly statistically significant with the expected signs. Female employment in agriculture in equation 1 has emerged as having the greatest effect on U5MR, while the gender parity index has emerged as the education variable with the greatest effect on the U5MR.

These findings are in line with the hypothesis that lack of access to education has a positive impact on child poverty and the null hypothesis is rejected at the 0.01 level. In addition to education factors, other variables play significant roles in explaining child poverty. For example, CU is a major cause of child underdevelopment which consequently leads to both late entry to school and poor performance that mostly leads to dropout thereby minimising employment prospects and subsequently increasing child poverty levels in the long term. These results point to the crucial role of education and health resources in reducing child poverty. A majority of Sub Saharan African countries fail to reap the full benefits of education because of low preschool enrolment rates that negatively affect children's achievement later on in life. Primary education is a must in the quest of reducing child poverty, however its success depends on the health status of children.

Children's health status is paramount to both school attendance and school outcomes. Malnourished children naturally suffer from cognitive skills and poor health thereby having a negative impact on both school attendance and performance. Children are malnourished because of a lack of household income to purchase both nutritious food and health services. The crop production index as a source of food and income turns out to be part of the solution. Although absolute poverty may cause a delay in entry to grade 1 and protraction through the journey of schooling, other issues like social exclusion and quality of education play a significant role in children's access to school.

There is a tendency for women to be household managers, and their success in managing largely depends on their status. An improved ratio of girls' to boys' enrolment in primary schools connotes high women's status with the appropriate knowledge which is acquired through schooling and this can positively impact the wellbeing of their families, which in the long run positively affects the primary school enrolment rate. However, the social-cultural factors that discriminate against women in the labour market do not only harm the women, but also their families which is evidenced by the negative effect of the ratio of female to male labour force participation rate on the PSE. A lack of efficacy spending, such as not channelling resources into crucial areas in the education sector probably due to corrupt practices, has contributed to the negative effect of Ibrahim's Index of African Governance on PSE.

The elasticity ranking indicates that the effect of child poverty on PSE is not as potent as that of the crop production index, CU, the ratio of female to male labour force participation rate and the Ibrahim Index African Governance. However, it should be noted that all these factors are influenced by child poverty, suggesting that the indirect effect of child poverty on PSE is stronger than the direct effect. For instance, CU is generally associated with children from poor families. The elasticity ranking with agricultural variables (female employment in agriculture and crop production index) are in the lead in all three equations, suggesting that strategies to reduce child poverty and to increase education should focus on creating an enabling environment for women in agriculture which in the process will increase agricultural output which positively affects education. The elasticity ranking shows that what is at issue is not the impact of education on reducing child

poverty, or the impact of child poverty on reducing education, but the improvement of women's status particularly in the agricultural sector.

In equation 3 women's status is represented by women being able to open a bank account, gender parity index and female secondary vocational education enrolment**,** and the latter has turned out to have statistical significance. The elasticity ranking reveals that the crop production index ranks first, while the female secondary vocational enrolment takes the second position in potency of impacting changes in CU. However, female education by itself is not sufficient to improve a child's wellbeing but other factors contributing to better status for women matter as well. It is not enough to target female education as a strategy in the reduction of CU. There is also a need to look into other issues such as women's access to labour markets, and access to productive resources such as employment is a catalyst that strengthens women's role in decision making. It is evident that factors affecting child poverty are interrelated and this situation calls for simultaneous actions.

6.2 Sub Saharan Africa's performance and progress in child poverty issues

The present study's quest for factors affecting child poverty has been investigated by answering questions such as- (1) Which are the most important variables affecting child poverty? (a) Identify country clusters of African countries based on their factor scores in the most important variables affecting child poverty (2a) Does a lack of access to education cause child poverty or does child poverty cause the lack of access to education? Or both and to what extent? (2b) To what extent can the low status of rural women be considered to be a contributing factor to child poverty? More particularly what is the impact of women's low status on children's health and education status? (3) What has Sub Saharan African progress in child poverty issues been? Are there any differences between (a) low income and middle income countries, high U5MR and low U5MR countries (b) region wise differences? We have dealt with the first two questions and now the third question should be answered. We attempt to answer it with the help of clustering countries based on GDP per capita and U5MR. The purpose of clustering is to compare the results of the estimated coefficients across the clusters and within the whole dataset in order to gauge the performance of individual clusters in child poverty.

Country classification using agglomerative hierarchical clustering was discussed in section 4.1.2 of Chapter 4. Countries have been clustered based on GDP per capita and U5MR. We have used the U5MR as a dependent variable to measure child poverty. U5MR has been chosen by UNICEF as its single most important indicator of the state of a nation's children and human development. U5MR as an accurate measure of children's wellbeing is used by UNICEF to rank the nations of the world not in ascending order of their per capita GNP, but in descending order of their U5MR (UNICEF 2008). Andrews et al. (2010) proposes the use of U5MR as an indicator of good governance that countries should be ranked based on U5MR. We follow UNICEF (2008) and Andrews (2010) and therefore cluster countries based on the average rates of child mortality between1990-2010. The following is a list of countries under respective clusters.

Table 6.2 ESTIMATES OF FACTORS AFFECTING CHILD POVERTY ACROSS COUNTRY CLUSTERS

EQUATION 1: DEPENDENT VARIABL-UNDER-FIVE MORTALITY RATE										
	Classification based on GNI per capita				**Classification based on U5MR**					
	Lower GNI	T- STAT	Lower middle GNI	T-STAT	U5MR > 10 %	T-STAT	U5MR < 10%	T-STAT	Whole Dataset	T-STAT
Constant	7.26	0.19	9.05***	15.51	37.87	1.18	7.46***	23.11	76.0***	5.64
Primary school enrolment	-0.12***	-5.31	-0.01***	-6.18	-0.01***	-3.81	-0.1***	-3.06	-0.09***	-5.44
Child underweight_1	0.70***	14.42	-0.01***	-1.46	0.76***	15.67	-0.01**	-2.02	0.76***	17.56
Gender parity index	0.12***	4.20	0.01***	4.84	0.08***	3.25	0.01	1.22	0.09***	4.42
Female empl. in agriculture	0.42	0.85	0.01***	3.46	0.11	0.28	0.01	1.47	-0.55***	-4.34
Agricultural value added	-0.01***	-3.42	-0.01	-0.79	-0.01***	-3.64	0.01**	2.11	-0.00***	-3.83
Health expend. per capita	-0.12**	-2.15	0.01	1.51	-0.15***	-3.38	0.01**	2.35	-0.13***	-3.53
Rural sanitation	-0.48	-0.79	-0.01	-0.93	-0.21*	-1.84	-0.01***	-4.21	-0.21***	-3.60
Ethnolinguistic fractionaliz.	-0.39***	-5.21	0.01***	2.85	-0.46***	-5.78	0.01***	3.21	- 0.42***	-6.44
Girls out of primary school	0.05*	1.94	-0.01	-0.45	0.04*	1.79	0.01***	4.76	0.03	1.62
Dummy variable W. Africa	-0.08*	-1.88	-0.01***	-4.55	-0.01	-1.45	-0.01	-0.39	-0.07**	-2.27
Number of observations	315		315		483		147		630	
EQUATION 2 dependent :	**Primary sch.enrol**									
Constant	-88.32	-0.64	330.48***	3.96	23.06	0.21	167.86*	1.69	183.65*	2.09
Under five mortality rate	-2.32***	-7.21	-40.97***	-4.32	-2.48***	-6.35	-58.37***	-5.64	-2.69***	-7.25
Child underweight	2.26	0.47	1.26	0.25	-1.45	-0.37	22.45***	3.63	-6.48**	-1.96
Gender parity index	0.26*	1.86	0.11	1.32	0.29***	2.60	0.08	1.17	0.37***	3.45
Crop production index_1	1.57***	5.83	0.73***	2.83	1.82***	5.57	0.48**	2.56	1.95***	6.44
Roads, paved	0.21***	4.37	0.48***	7.95	0.28***	5.99	0.49***	7.45	0.28***	6.12
Persistence to last grade prim.	0.44***	4.09	0.22***	3.23	0.36***	4.16	0.28***	4.30	0.36***	4.76
Ratio female to male labor F.P.	-0.74***	-3.28	-0.09	-0.48	-0.92***	-4.15	-0.23*	-1.67	-1.02***	-5.05
Children in employment	-0.01***	-4.03	-0.01*	-1.78	-0.01***	-4.04	0.01**	2.26	-0.01***	-4.31
Girls out of primary school	0.11	0.92	-0.30***	-4.99	-0.17*	-1.93	-0.02	-0.26	-0.22***	-2.96
Ibrahim´s index African govern.	1.51	1.07	-0.41	-0.98	-0.03	-0.03	0.93	1.58	-1.18**	-2.19
Orphans	-0.01*	-1.95	0.67	1.04	-0.01*	-1.76	0.39	0.71	-0.01*	-1.84
Female primary school teacher	0.21	1.49	0.23***	2.96	0.17	1.56	0.39***	3.39	0.18*	1.74
Mobile phone subscribers.	-1.61	-1.12	0.31	0.81	-0.12	-0.11	-0.91	-1.51	1.01*	1.93
Dummy variable South Africa	-0.42***	-3.29	-0.23***	-2.95	-0.36***	-3.65	-0.14	1.39	-0.33***	-4.07
Dummy variable West Africa	-0.29*	-1.94	-0.25**	-2.26	-0.35***	-2.67	0.01	0.02	-0.36***	-2.91
Number of observations	315		315		483		147		630	
EQUATION 3 dependent:	**Child underweight**									
Constant	7.21	0.87	6.71	1.15	11.59	1.53	16.97***	4.15	24.8***	6.67
Child underweight_1	0.68***	6.01	0.36***	5.53	0.71***	6.39	0.11***	3.45	0.48***	7.01
Under five mortality rate	0.07***	4.62	1.27***	5.66	0.05***	2.73	0.63***	2.87	0.03***	2.79
Primary school enrolment	-0.02	-0.49	0.01	0.38	-0.06	-1.43	-0.06**	2.00	-0.08***	-3.02
Gender parity index	-0.01	-1.09	-0.01**	-2.10	0.01*	1.68	0.01	0.34	0.01***	3.68

Crop production index	0.63***	6.03	0.24***	4.51	0.61***	5.73	0.04	1.28	0.33***	5.41
Crop production index_1	-0.66***	-6.00	-0.34***	-5.55	-0.67***	-6.07	-0.11***	-3.77	-0.44***	-6.54
Enrolment in sec. voc. female	-0.37	-1.51	0.91	0.46	-0.39*	-1.66	0.18	0.15	-0.71***	-3.80
Wood fuel	0.42*	1.89	0.38	1.14	0.36*	1.79	-0.16***	-5.35	0.61***	3.65
Age at first marriage	0.01	0.39	0.01***	3.04	0.01	0.76	0.01	1.42	0.04***	2.83
Out of school children	0.02	0.57	-0.01	-0.27	0.06	0.17	0.06**	2.03	0.08***	2.91
Married women bank account	-0.01	-0.88	-0.01	-1.51	-0.01	0.29	-0.01***	5.39	-0.02**	-2.27
Ibrahim's Index African gov.	0.04	0.91	-0.01	-1.51	-0.01	-0.19	0.01***	3.23	-0.02**	-2.06
Ethnolinguistic fractionalization	-0.01	-0.30	-0.01	-0.45	-0.01	- 0.35	0.01	0.42	-0.01**	-2.13
Mobile phone subs.	-0.04	-0.91	0.01	1.50	0.01	0.14	-0.01***	-3.69	0.02*	1.90
Dummy variable West Africa	0.01	0.43	0.01***	2.65	-0.01*	-1.84	0.01	1.02	-0.00**	-2.37
Dummy variable South Africa	0.01	0.58	0.01	0.55	-0.01	-1.62	-0.01	-1.53	-0.01	-1.56
Number of observations	315		315		483		147		630	

The numbers in parentheses below the estimated coefficients are absolute values of the "t" ratios. Three asterisks, two asterisks and one asterisk besides the estimated coefficients denote statistical significance at 0.01, 0.05 and 0.10 levels respectively valued at two-sided test. All the variables are in percentages, with the exception of regional dummies and married women with access to bank account which is a dummy variable.

Lower GNI per capita	**Lower middle GNI per capita**	**U5MR >10**	**U5MR<10**
Benin	Botswana	Benin	Botswana
Burkina Faso	Gabon	Burkina Faso	Gabon
Burundi	Mauritius	Burundi	Ghana
C.A.R	South Africa	Cameroon	Kenya
Chad	Cameroon	Central Africa Republic	Lesotho
Congo Democratic .Rep.	Congo .Republic.	Chad	Mauritius
Guinea .Bissau	Cote d'Ivoire	Congo Republic	S. Africa
Madagascar	Gambia	Congo Democratic Republic	
Malawi	Ghana	Cote d'Ivoire	
Mali	Kenya	Gambia	
Mozambique	Lesotho	Guinea Bissau	
Niger	Mauritania	Madagascar	
Rwanda	Nigeria	Malawi	
Togo	Senegal	Mali	
Uganda	Zambia	Mauritania	
		Mozambique	
		Niger	
		Nigeria	
		Rwanda	
		Senegal	
		Togo	
		Uganda	
		Zambia	

Table 6.2 presents results of simultaneous equations with the same dependent and independent variables and instruments as those used in Table 6.1 in the preceding subsection. The only difference is the subdivision of the whole dataset into two subgroups of GNI per capita and U5MR.

The interpretation of the estimates in Table 6.2 are done simultaneously with their elasticities in Table 6.3

Table 6.3 ESTIMATED ELASTICITIES OF FACTORS AFFECTING CHILD POVERTY IN COUNTRY CLUSTERS

	Lower GNI per capita Elasticity	Lower middle GNI per capita Elasticity	U5MR> 10% Elasticity	U5MR<10% Elasticity	Whole dataset elasticity
EQUATION 1: DEPENDENT VARIABLE-UNDER FIVE MORTALITY RATE					
Primary school enrolment	-0.61	-0.05	-0.05	-0.05	-0.46
Child underweight_1	1.24	-0.02	1.35	-0.02	1.35
Gender parity index	0.75	0.06	0.50	0.06	0.56
Female employment in agriculture	1.89	0.05	0.50	0.05	-2.48
Health expenditure per capita	-0.05	0.00	-0.06	0.00	-0.05
Rural sanitation	-0.89	-0.02	-0.39	-0.02	-0.39
Ethnolinguistic fractionalization	-1.88	0.05	-2.21	0.05	-2.02
Girls out of school	0.17	-0.03	0.13	0.03	0.10
EQUATION 2: DEPENDENT VARIABLE -PRIMARY SCHOOL ENROLMENT					
Under five mortality rate	-0.45	-8.02	-0.49	-11.43	-0.53
Child underweight	0.78	0.43	-0.50	7.73	-2.23
Gender parity index	0.32	0.13	0.36	0.10	0.45
Crop production index_1	2.00	0.93	2.32	0.62	2.49
Roads, paved	0.07	0.15	0.09	0.16	0.09
Persistence to last grade of primary	0.35	0.18	0.29	0.22	0.29
Ratio of female to male labour F.P rate	-0.86	-0.10	-1.07	-0.28	-1.19
Girls out of school	0.07	-0.20	-0.11	-0.01	0.00
Ibrahim's index of African governance	1.11	-0.30	-0.02	0.68	-0.87
Orphans	0.00	0.18	0.00	0.11	0.00
Female teacher primary school	0.12	0.13	0.10	0.22	0.11
Mobile phone subscribers	-0.84	0.16	-0.06	-0.47	0.52
EQUATION 3: DEPENDENT VARIABLE - CHILD UNDERWEIGHT					
Child underweight_1	0.69	0.36	0.72	0.11	0.48
Under five mortality rate	0.04	0.72	0.03	0.36	0.02
Primary school enrolment	-0.06	0.03	-0.17	-0.17	-0.23
Gender parity index	-0.04	-0.04	0.04	0.04	0.04
Crop production index	2.39	0.91	2.32	0.15	1.25
Crop production index_1	-2.44	-1.26	-2.52	-0.41	-1.63
Enrolment in sec. Vocational, female	-0.60	1.47	-0.63	0.29	-1.15
Wood fuel	0.20	0.18	0.17	-0.08	0.29
Child marriage	0.01	0.01	0.01	0.01	0.04
Out of school children	0.03	-0.01	0.08	0.08	0.11
Ibrahim's Index of African Governance	0.09	-0.02	-0.02	0.02	-0.04
Mobile phone subscribers	-0.06	0.02	0.02	-0.02	0.03

6.2.1 Results of country clusters of factors affecting child poverty

In this subsection, we start with the cluster of lower GDP per capita, middle lower GDP per capita, U5MR above 10%, U5MR below 10% and then an overall comparison.

Lower GDP per capita.

In Table 6.2, the results of the estimated coefficients of primary school enrolment, child underweight, gender parity index, agricultural value added, health expenditure per capita and ethnolinguistic fractionalization on the dependent

variable of U5MR in equation 1 in the cluster of low GDP per capita in the second column have retained the same high statistical significance, like the whole dataset in the fifth column. The estimated coefficient of rural sanitation has lost its statistical significance in both lower GDP per capita and middle GDP per capita country clusters as compared to the whole dataset. A majority of African countries have very low percentages of rural population with access to adequate sanitation facilities, this applies to both lower and middle income countries. Estimated girls out of school is positive (0.05) and statistically significant at the 0.01 level, and the estimated elasticity in Table 6.3 indicates that a 1% increase in girls out of school will increase child poverty by 0.17%. Girls out of school has more effect on child poverty in lower income countries in comparison to the whole dataset where its effect was affected by countries with high primary school enrolment rates and higher gender parity index.

In equation 2 with primary school enrolment as a dependent variable, the estimated coefficients of the U5MR, crop production index_1, paved roads, persistence to last grade primary school, ratio of female to male labour force participation rate, the children in employment and orphans 0-17 years currently living have maintained the statistical significance they have in the whole dataset in explaining primary school enrolment. Child underweight and girls out of school have wrong expected signs as well as lost statistical significance. The estimated coefficients of the U5MR, child underweight_1, crop production index, and crop production index_1 in the cluster of low GDP per capita in equation 3 have maintained statistical significance. Female enrolment rates in secondary school vocational education is low across Africa, with the highest in the low-income cluster being Burkina Faso and Rwanda at 50% and in the middle income cluster Lesotho has 61%, Congo Republic (50%) and Cote d'Ivoire (50%) the rest of Sub Saharan African countries have less than 50% female enrolled in secondary school vocational education. Female enrolment rates in secondary school vocational education in the lower-income cluster is negative (-0.37) and is statistically insignificant. The estimated elasticity (Table 6.3) indicates that a 1% increase in female enrolment rates in secondary school vocational education will decrease child underweight by 0.60% in lower income countries and by 1.15% in the whole dataset. Wood fuel, a proxy for shelter is positive (0.42) and is statistically significant at the 0.10 level. The estimated elasticity indicates that a 1% increase in wood fuel will increase child underweight in lower income countries by 0.20% and in the whole dataset by 0.29.

Lower middle GDP per capita cluster.

In equation 1 on U5MR, the estimated coefficient of PSE has high statistical significance partly because lower middle income countries like Gabon, Mauritius and South Africa have PSE over 90%. It is assumed that families in lower middle income countries in Africa have more opportunities to send their children to school as compared to those from the lower-income countries. Female employment in agriculture is statistically significant but without the expected sign. The literature review in Chapter 2 explained that women in Africa produce a large proportion of the agricultural food, but at the same time lack access to land and other productive resources. Faced with these constraints, it is possible that in high income countries women end up taking jobs in other sectors which consequently reduces the number of women

in agriculture, subsequently leading to decreasing agricultural output which contributes to increasing U5MR. Middle lower income countries with low percentages of women in agriculture are Mauritius (10%), Botswana (17%) South Africa 15%, Gabon 44% and Nigeria (41%). ELF as a proxy for women's groups and institutional quality is statistically significant in both clusters with a negative sign in the lower income countries and a positive sign in the lower middle income countries.

In equation 2, the estimated U5MR is negative (-40.97) with very strong negative effects on PSE. The estimated elasticity in Table 6.3 indicates that a 1% increase in U5MR will reduce PSE by 8% in lower middle income countries as compared to 0.45% in lower income countries and 0.53% in the whole dataset. In equation 3, in Table 6.2, the estimated coefficient of U5MR is positive (1.27) and is statistically significant at the 0.01 level. The estimated elasticity shows that a 1% increase in child poverty will increase CU by 0.72% in lower middle income countries, 0.04% in low income countries and 0.02% in the whole dataset.

Under-five mortality rate above 10%

In equation 1, all the estimated coefficients with the exception of female employment in agriculture and the dummy variable of West Africa are statistically significant with the expected sign. While in the second equation all the variables are statistically significant with the expected signs with the exception of child underweight, Ibrahim's index African Governance, female primary school teacher and mobile phone subscribers. In the third equation, child underweight with a one year lag, U5MR and crop production index have retained the same statistical significance as in the whole dataset. Conversely all the variables representing education such as primary school enrolment, gender parity index, female enrolment in secondary vocational education have lost their statistical significance in comparison to the whole dataset. Out of the 23 Sub Saharan African countries with U5MR above 10% between1990-2010, only Chad, Congo Republic, Guinea Bissau, Madagascar and Mauritania had below 20% of their children out of school, the rest of the countries had very high percentages of out of OOSC. This is one of the probable reasons for the education variables having insignificant results.

In the third equation child, the estimates child underweight with a one year lag, U5MR, crop production index and crop production index with a one year lag have maintained their statistical significance as in the whole dataset. While the estimates gender parity index, female enrolment in secondary vocational, wood fuel and dummy variable for West Africa are modestly statistically significant in comparison to the whole dataset. The estimate primary school enrolment is negative (-0.06), the estimated elasticity shows that a 1% increase in primary school enrolment will reduce child underweight in both countries with U5MR above 10% and U5MR below 10% by 0.17% and in the whole dataset 0.23%.

Under-five mortality rate below 10%

Out of the ten estimates in equation 1 on U5MR, seven are statistically significant, but child underweight, agricultural value added and health expenditure per capita do not have the expected signs. All the countries in this cluster: Botswana, Gabon, Ghana, Kenya, Lesotho, Mauritius and South Africa have a ratio of over 95%

of girls to boys' primary school enrolment, low percentages of OOSC, over 50% IIAG pointing to good governance and over 35% of the female enrolled in secondary school vocational education. In the second equation on primary school enrolment, U5MR as a proxy for child poverty is negative (-58.37) and statistically significant at 0.01. The estimated elasticity in table 6.3 indicates that a 1% increase in U5MR will reduce PSE by 11.43% while in the whole dataset it is 0.53%. The estimate of child underweight is statistically significant but with the wrong sign, although the estimate of gender parity index is statistically insignificant, the estimated elasticity reveals that 1% increase in GPI will increase PSE by 0.10%. The effect of good governance on education shows that although IIAG is statistically insignificant, the estimated elasticity indicates that 1% increase in IIAG will increase PSE by 0.68%.

In equation 3 on child underweight, the estimated coefficients of child underweight with a one year lag, U5MR, PSE, crop production index with a one year lag, OOSC, married women can open a bank account, IIAG and mobile phone subscribers are statistically significant with the expected signs. Wood fuel is statistically significant but with the wrong sign. The estimated coefficient of married women having access to open a bank account is negative (-0.01) and is statistically significant at the 0.01 level, but it has no statistical significance in any of the country clusters, with the exception of the cluster of U5MR below 10% and in the whole dataset where it is statistically significant at 0.05. Married women can open a bank account is a dummy variable and therefore has no elasticity estimates. Apparently, all the countries clustered under U5MR below 10% belong to the middle lower income countries. Women from middle lower income countries have better opportunities to have bank accounts because of micro finance lending institutions. It has been mentioned elsewhere in this study that women tend to spend more of their income on food while men tend to spend more of their income on assets, and thus as more women access income, the lower will become the percentages of CU.

(ii) Comparison of overall performance

Overall performance based on elasticities in Table 6.3 shows that in equation 1, the estimated coefficient of primary school enrolment has more potency on the U5MR in lower GNI per capita cluster than in the rest of the clusters. The estimated elasticity shows that a 1% increase in primary school enrolment will decrease child poverty by 0.61% in the lower income group, 0.05% across the rest of the clusters – lower middle income, U5MR above and below 10% groups and 0.46% in the whole dataset. Child underweight is more potent on child mortality in the lower income group, U5MR above 10% and in the whole dataset. Gender parity index is more potent in the lower income group, U5MR above 10% and in the whole dataset, the same case applies to the rest of the estimated coefficients; they have more potency on U5MR in the lower income group and U5MR above 10%. For instance, a 1% increase in women's membership in groups formed on the basis of ethnicity (ELF) with the object of facilitating credit to rural women will decrease child poverty by 1.88% in lower income countries, 2.21% in U5MR above 10% countries and 2.02% in the whole dataset.

In equation 2, the estimates of gender parity index, crop production index with a one year lag, persistence to the last grade of primary and ratio of female to male labour force participation rate are more potent on the primary school enrolment rate in lower income and U5MR above 10% countries than in the lower middle

income and U5MR below 10% countries. Besides the estimate U5MR which has very strong potent on primary school enrolment in lower middle income and U5MR below 10% clusters, the estimate of crop production index_1 ranks first for potency on primary school enrolment in all the groups. The averages of the crop production index 1990-2010 exceed 75% in all countries in all clusters, and it turns out that lower income countries perform better than middle lower income countries in crop production. Elasticity estimates indicate that a 1% increase in crop production will increase primary school enrolment by 2% in lower income countries, 0.93% in lower middle income countries, 2.32% in U5MR above 10% countries, 0.62% in U5M5 below 10% countries and 2.49% in the whole dataset. The ratio of female to male labour force participation rate is also more potent on primary school enrolment in the lower income and U5MR above 10% countries; the estimated elasticity indicates that a 1% increase in gender inequality in the labour market will decrease primary school enrolment by 0.86% in lower income countries, by 0.10% in middle income countries, by 1.07 in U5MR above 10% countries, 0.28% in U5MR below 10% countries and by 1.19% in the whole dataset.

The estimated coefficient of U5MR in the third equation follows the same pattern as in the second equation. It is the only estimate with more potency on child underweight in both lower middle income countries and countries with U5MR below 10%. The elasticity estimates show that a 1% increase in child poverty will increase child underweight by 0.72% in middle lower income, 0.36% in countries with U5MR below 10% and 0.02% in the whole dataset. The estimated coefficients of crop production index in equation 3 has more potency on child underweight in lower income and U5MR above 10% countries. The estimated elasticity indicates that a 1% increase in crop production index_1 decreases child underweight by 2.44% in lower income countries, 1.26% in middle lower income countries, 2.52% in countries with U5MR above 10%, 0.41% in countries with U5MR below 10% and 1.63% in the whole dataset. Female enrolment in secondary vocational education is more potent on child underweight in the lower income and U5MR above 10% countries. A 1% increase in the number of women or girls enrolled in secondary vocational education leads to a decrease in child underweight by 0.60% in lower income, 0.63% in countries with U5MR above 10% and 1.15% in the whole dataset. Its potency on lower middle income and U5MR below 10% is strong but with the wrong sign. Primary school enrolment has a modest effect on child underweight in comparison to other estimated coefficients like the Ibrahim Index African Governance, mobile phone subscribers, OOSC and child marriage. The estimated elasticity shows that a 1% increase in primary school enrolment will decrease child underweight by 0.06% in lower income countries, 0.03% in lower middle income countries, 0. 17% in both U5MR above 10% countries and U5MR below 10% countries and 0.23% in the whole dataset.

The estimates of lower income countries and U5MR above 10% countries are more potent on the U5MR in equation 1, on the primary school enrolment in equation 2 and child underweight in equation3 in comparison to lower middle income countries and U5MR below 10% countries as evidenced in Table 6.3. Table 6.2 shows that lower income countries and countries with U5MR above 10 % have fewer total numbers of estimated coefficients with statistical insignificance and wrong expected signs as compared to lower middle income

countries and countries with U5MR below 10%. These results suggest that lower income countries and countries with U5MR above 10% explain better factors affecting child poverty than lower middle income countries and countries with U5MR below 10%.

Which are the characteristics of individual country clusters?

We compare averages of selected variables of individual country clusters to gauge their characteristics.

TABLE 6.4 COMPARISON OF U5MR<10% Vs. U5MR>10%; LOWER MIDDLE INCOME Vs. LOWER INCOME, LOWER MIDDLE INCOME VS. U5MR<10%; LOWER INCOME Vs. U5MR>10%

A	U5MR below 10%	U5MR above 10%	Differences in %	Lower middle GNI	Lower GNI per capita	Differences in %
Under five mortality rate	7.56	15.34	-7.77	10.67	16.43	-5.76
Gender parity index	101.32	79.08	22.23	93.28	76.22	17.06
Out of school children	20.13	35.81	-15.69	26.18	37.75	-11.57
Primary school enrolment	80.62	64.19	16.44	74.20	62.24	11.96
Ibrahim index African governance	64.65	46.41	18.24	55.00	46.33	8.68
Child underweight	15.06	26.33	-11.27	20.02	27.39	-7.37
B	Lower middle GNI	U5MR below 10%	Differences in %	Lower GNI per capita	U5MR above 10%	Differences in %
Under-five mortality rate	10.67	7.56	3.11	16.43	15.34	1.09
Gender parity index	93.28	101.32	-8.04	76.22	79.08	-2.87
Out of school children	26.18	20.13	6.06	37.75	35.81	1.94
Primary school enrolment	74.20	80.62	-6.42	62.24	64.19	-1.94
Ibrahim index African governance	55.00	64.65	-9.65	46.33	46.41	-0.08
Child underweight	20.02	15.06	4.96	27.39	26.33	1.06

The differences in averages of selected variables between U5MR below 10% cluster and U5MR above 10% cluster in Table 6.4A show a very wide disparity between the two clusters. The U5MR below 10% cluster has 22.23% more gender parity index and 18.24% more scores in IIAG (good governance). A higher percentage of IIAG is one of the probable reasons why countries in this cluster have higher percentages of primary school enrolment and improved women's status. High percentages of gender parity index (improved women's status) contributes to lower percentages of child underweight, U5MR and OOSC. The lower middle income cluster has 17.06% more gender parity index and 8.68% higher percentages of IIAG, better percentages of these two variables contributes to the reduction of child poverty issues in similar ways as that of the cluster with U5MR below 10%.

Table 6.4 B compares the lower middle income cluster with U5MR below 10% cluster. The lower middle income cluster has lower percentages of gender parity index, IIAG and primary school enrolment and higher percentages of U5MR, OOSC and child underweight. Although the U5MR below 10% cluster has similar results to the lower middle income cluster, it is notable that the U5MR below 10% cluster has better scores as compared to the lower middle income cluster.

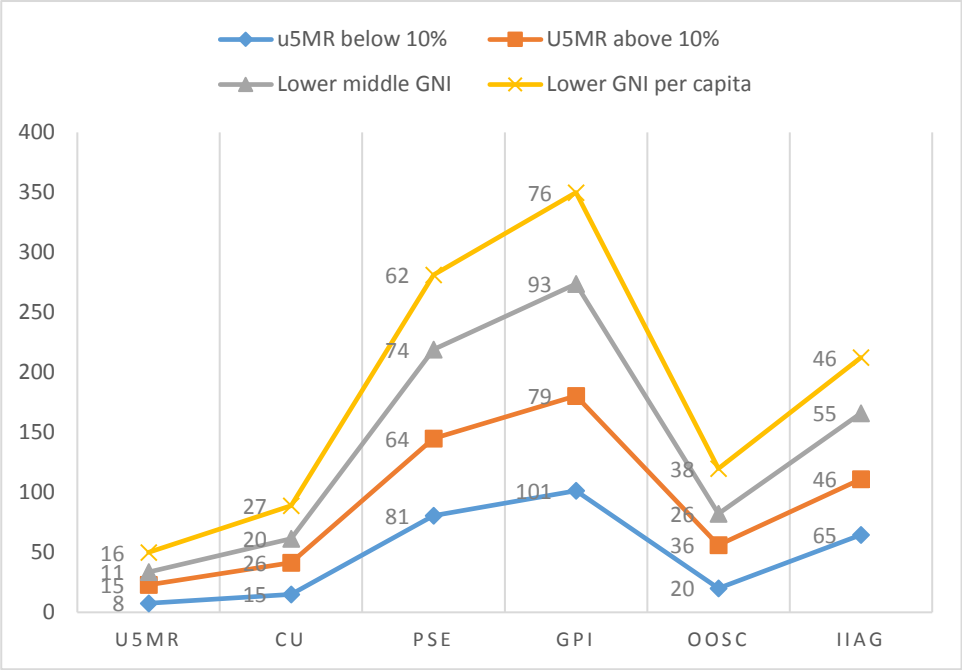


Figure 6.3 Comparison of averages of selected variables across U5MR below 10%, U5MR above 10%, lower middle income and lower income clusters

The figure depicts that the cluster of U5MR below 10% has the highest percentage of IIAG, GPI and PSE and the lowest percentage of U5MR, CU and OOSC. Lower GNI has the lowest IIAG, GPI and PSE; and the highest U5MR, CU and OOSC. Table 6.4A shows that out of the 23 Sub Saharan African countries in the cluster of U5MR above 10%, between 1990-2010 16 of them had U5MR above the total average (13.48%), 12 had CU above the total average of 23.35%, 11 had a GPI below the total average (80.94%), 17 had below the total average of PSE, 17 had OOSC above the total average of (29.83%). It has been mentioned elsewhere in this study that the biggest challenge Africa faces is how to retain children in school up to the completion of primary school cycle. All the countries in the cluster of U5MR below 10% had below average U5MR, CU, OOSC and above average GPI, PSE, and only Gabon had below average IIAG.

Table 6.4B on the lower middle income and lower income clusters reveals that Nigeria and Zambia from the lower middle income cluster had U5MR above the average (13.48), while 12 countries out of the 15 countries in the lower income countries had U5MR above the total average. Four countries in the lower middle income and eight in the lower income had CU above the average (23.70). Out of the 15 countries in the lower middle income cluster Gambia and Cote d'Ivoire had GPI below the total average of 80.94%. Six countries from the lower middle income and seven from the lower income had IIAG below the average (50.60). Lower middle income cluster had seven countries below total average of PSE and seven above the average of OOSC. While lower income cluster had 11 countries below total average of PSE and ten above the average of OOSC. In sum Tables 6.4A and B; 6.5A and B; and Figure 6.3 suggests that middle income and U5MR below 10% clusters have similar characteristics of better performance in child poverty issues particularly the cluster of U5MR below 10%. Whereas the lower income and U5MR above 10% clusters have similar characteristics of poor performance in child poverty issues particularly the cluster of U5MR above 10%.

Table 6.5A POORLY PERFORMING COUNTRIES IN U5MR < 10% & U5MR > 10% CLUSTERS WITH SCORES BELOW RESPECTIVE CLUSTER AVERAGES

U5MR >10%	**U5MR13.48**	**U5MR >10%**	**GPI(80.94)**	**U5MR >10%**	**OOSC(29.83)**		**SEP(70.34)**	**U5MR<10%**	**IIAG(50.86)**	**U5MR >10%**	**CU 23.35**
B. Faso	13.67	Mozambique	76.57	Malawi	35.79	Mozambique	38.82	Gabon	48.58	Togo	30.53
Cote D'Ivoire	14.11	Niger	62.54	Mozambique	61.17	Niger	59.15	**U5MR >10%**		Uganda	43.67
Gambia	16.46	Nigeria	55.48	Niger	40.85	Nigeria	52.31	Niger	29.14	Zambia	30.82
G. Bissau	13.84	Rwanda	72.58	Nigeria	47.70	Rwanda	52.61	Nigeria	31.29	Mozambique	32.58
Madagascar	15.64	Senegal	65.59	Rwanda	47.40	Senegal	58.42	Rwanda	39.75	Niger	25.70
Malawi	16.52	Togo	69.29	Senegal	41.58	Togo	54.44	Senegal	36.30	Nigeria	32.47
Mali	15.92	Uganda	64.35	Togo	45.55	Uganda	38.82	Uganda	43.97	Mali	24.86
Mauritania	14.65	Malawi	77.73	Uganda	61.18	Zambia	63.19	Zambia	43.71	Gambia	36.33
Mozambique	18.08	Cote D'Ivoire	63.91	Zambia	36.81	Malawi	64.21	Gambia	42.06	Congo Dem.	37.12
Niger	17.03	Chad	66.90	**Benin**	33.16	**Benin**	66.84	G. Bissau	45.96	Cameroon	28.21
Nigeria	18.90	B. Faso	69.37	B. Faso	44.64	B. Faso	55.36	**Benin**	31.55	C.A.R	23.98
Rwanda	17.56			Burundi	36.68	Burundi	63.33	B. Faso	40.60	**Benin**	31.05
Senegal	18.36			Cameroon	33.62	Cameroon	66.38	Cameroon	43.97		
Togo	21.18			C.A.R	35.49	C.A.R	64.51	Chad	40.55		
Uganda	20.98			Congo Dem.	32.72	Congo Dem.	67.27				
Zambia	17.72			Cote D'Ivoire	31.32	Cote D'Ivoire	68.67				
				Gambia	40.82	Gambia	59.18				

TABLE 6.5B POORLY PERFORMING COUNTRIES IN LOWER MIDDLE GNI & LOWER GNI CLUSTERS WITH SCORES BELOW RESPECTIVE CLUSTER AVERAGES

Lower middle GNI	**U5MR (13.58)**	**Lower middle GNI**	**GPI (80.39)**	**Lower middle GNI**	**OOSC (30.57)**	**Lower middle GNI**	**SEP (69.59)**	**Lower middle GNI**	**IIAG (50.60)**	**Lower middle GNI**	**CU (23.70)**
Zambia	14.65	Gambia	77.62	Nigeria	36.81	Nigeria	63.19	Nigeria	43.71	Nigeria	30.82
Nigeria	17.72	Cote d'Ivoire	69.37	Senegal	35.49	Senegal	64.51	Mauritania	43.97	Senegal	23.98
Lower GNI		**Lower GNI**		Mauritania	33.62	Mauritania	66.38	Cameroon	45.96	Mauritania	28.21
Benin	14.11	Mozambique	77.06	Gambia	36.68	Gambia	63.33	Congo Republic	31.55	Congo Repu	31.05
B. Faso	18.08	Niger	63.46	Ghana	34.06	Ghana	66.20	Cote d'Ivoire	40.60	**Lower GNI**	
Burundi	16.46	Togo	66.90	Congo Republic	33.16	Congo Republi	66.84	Gabon	48.58	Niger	43.67
C.A.R	17.03	Benin	63.91	Cote d'Ivoire	44.64	Cote d'Ivoire	55.36	**Lower GNI**		Rwanda	24.86
Chad	18.90	B. Faso	75.64	**Lower GNI**		**Lower GNI**		Niger	43.97	Mali	30.53
Congo D. Rep.	17.56	C.A.R	62.54	Mali	45.55	Mali	54.44	Togo	40.55	Madagascar	37.12
G. Bissau	18.36	Chad	54.87	Mozambique	35.79	Mozambique	64.21	Burundi	42.06	Burkina Faso	32.58
Malawi	15.64	Congo D. Rep.	75.77	Niger	61.18	Niger	38.82	C.A.R	29.14	Burundi	36.33
Mali	21.18	G. Bissau	65.59	B. Faso	61.17	Benin	68.67	Chad	31.29	C.A.R	25.70
Mozambique	16.52	Mali	68.59	Burundi	40.82	Burkina Faso	38.82	Congo Dem.Rep.	39.75	Chad	32.47
Niger	20.98			C.A.R	40.85	Burundi	59.18	Guinea Bissau	36.30		
Rwanda	15.92			Chad	47.70	C.A.R	59.15				
				Congo D. Rep.	47.40	Chad	52.31				
				G. Bissau	41.58	Congo D.Rep.	52.61				
				Madagascar	32.72	Guinea Bissau	58.42				
						Madagascar	67.27				

6.2.2 Region wise comparison of Sub Saharan African performance

The foregoing subsection presented analysis of African countries' performance based on country clusters of GDP per capita and U5MR. We now turn to how countries performed region wise and across time periods. In order to gauge the progress, the time period has been split into two sub-periods, 1990-1992 and 2008-2010.

Table 6.6 Comparison of the performance of regions of Sub Saharan Africa in factors affecting child poverty

Region	Central Africa		Comparison	Percent	East Africa		Comparison	Percent	Southern Africa		Comparison	Percent	West Africa		Comparison	Percent
YEAR	1990 to 1992	2008 to 2010	2nd - 1st period	Change	1990 to 1992	2008 to 2010	2nd - 1st period	Change	1990 to 1992	2008 to 2010	2nd - 1st period	Change	1990 to 1992	2008 to 2010	2nd - 1st period	Change
Under 5 Mortality rate	15	14	-1	-9	16	8	-8	-49	7	6	-1	-13	18	12	-6	-33
Neonatal Mortality	41	34	-7	-18	42	28	-15	-35	36	30	-7	-18	44	31	-13	-30
Underweight Children	24	20	-4	-17	28	19	-8	-31	14	11	-3	-21	30	20	-10	-33
Gender parity index	72	75	3	4	84	96	13	15	100	100	0	0	64	91	27	43
Preschool Enrolment	6	11	5	81	44	34	-10	-22	93	34	-59	-63	4	16	12	267
Primary school enrolment	61	82	21	35	65	93	28	43	80	81	1	1.25	40	67	27	66
Persistence to Last Grade Primary school	44	52	7	16	37	49	12	33	62	81	19	31	48	66	18	38
Out of School Children	39	18	-21	-53	35	7	-28	-80	30	19	-10	-35	60	33	-27	-45
Ratio Female to male labour force P. rate	80	87	7	9	91	93	2	2	69	81	13	18	64	75	11	17
Female in agriculture	68	61	-7	-10	74	72	-2	-3	36	31	-5	-15	59	54	-5	-9
Female vocational Sec.	41	37	-4	-9	34	41	7	21	59	53	-6	-10	25	47	22	88
Rural Sanitation	13	23	11	84	34	41	6	19	43	44	1	3	11	17	6	52
Ibrahim Governance Index		39	-	-	-	57	-	-	-	70	-	-	-	50	-	-
Cro Production Index	78	113	35	45	76	118	42	55	75	97	22	29	59	121	62	105
Female Teach. Primary	23	31	8	35	39	50	12	30	69	76	7	10	27	30	2	9
Health Expenditure		4	-	-	-	7	-	-	8	8	-	-	-	6	-	-
Paved Roads	8	17	9	113	28	44	17	61	22	-	-	-	18	22	3	18
Agriculture value added	9	16	7	71	-1	4	5	-549	-2	6	8	-367	2	7	5	355
Mobile Phone		80	-	-	-	58	5-	-	-	100	-	-	-	85	-	-
0-14 % Male Population	45	44	-2	-4	48	46	-2	-4	46	39	-7	-15	45	42	-2	-5
0-14 % Female Populati	44	43	-1	-2	46	45	-1	-3	44	37	-6	-14	44	41	-3	-7

Sub Saharan Africa consists of 45 countries, however due to lack of data on variables of our interest, 15 countries have been excluded. Despite the exclusion, all the four regions of Sub Saharan Africa are well represented. Sub Saharan African regions are:

Central Africa	**East Africa**	**Southern Africa**	**West Africa**
Cameroon	Burundi,	Botswana	Benin
Central Africa Republic	Kenya	Lesotho	Burkina Faso
Chad,	Madagascar,	South Africa	Cote d'Ivoire
Congo Republic	Malawi		Gambia
Democratic R. Congo	Mauritius,		Ghana
Gabon.	Mozambique		Guinea Bissau
	Rwanda		Mali
	Uganda, Zambia		Mauritania, Niger, Nigeria,
			Senegal and Togo.

Regional averages of the respective periods have been calculated, and comparisons between the two periods under study have been effected by subtracting the results of the second period from the results of the first period and then the percentage changes have been calculated with the objective of detecting any changes between the two periods.

(i) Under-five mortality rate

Table 6.6 indicates that between1990-1992, Southern Africa had the lowest U5MR of 7%, while West Africa had the highest U5MR of 18%. Niger (30%) and Mali (25%) were the outliers. Although regional averages show region-wide performance, they tend to conceal individual country performance. For instance, Mauritius has the lowest U5MR (2%) but it falls under East Africa, the average of which was 16%. During the period 2008-2010, U5MR were lower throughout Sub Saharan Africa, as compared to 1990-1992. Comparisons between the two periods indicate that both Central Africa and Southern Africa reduced U5MR by 1%, but had very different percent changes: Central Africa had -9% and Southern Africa had -13%. During 2008-2010, although West Africa had the second highest U5MR (12%) after Central Africa (14%), it apparently had a notable percentage reduction of 33%. East Africa had the highest percent change reduction of child mortality, down to 49%, recording the second lowest mortality.

(ii) Child underweight (child's health)

In 1990-1992, the averages reveal that West Africa had the highest percentage of underweight children (30%). Central Africa features as the second-ranked region with the highest proportion of underweight children, although Gabon, a Central African country had the lowest percent of underweight children (12%). All regions recorded percentage reductions during 2008-2010 in comparison to 1990-1992, despite the fact that West Africa had the highest percentage of underweight children, at the same time, it recorded the highest reduction from 30% in 1990-1992 to 20% in 2008-2010, a 10% reduction or -33% change.

(iii)P*rimary school enrolment (child's education)*

Southern Africa had the highest primary school enrolment of 80% in 1990-1992, while West Africa had the lowest, with only 40% of its primary school age children enrolled at school. Niger had a mere 23% and Burkina

Faso 26% of their children enrolled at school. During 2008-2010, the East African region took the lead with 93% of its children enrolled at school with an increase of 28% (93% in 2008-2010 as compared to 65% in 1990-1992) and had -43 percent change. West Africa was the least with an enrolment of 67%, but had a remarkable percentage change of 66%. Southern Africa lost its first position and took third place with 81% of its children enrolled at school. The results shown in Table 6.6 imply that primary school enrolment rate has largely improved across Sub Saharan Africa, however the issue is how to retain children in school until the last grade. Comparisons of survival to the last grade across Africa in Table 6.6 is only tentative because there is no uniformity in what the last grade is across Africa. The final grade ranges from the fifth grade in some countries to the eighth grade in others. A country or region with the fifth grade as its last grade is likely to have a higher percentage of survivors to the last grade as compared to a country with 8^{th} grade as the last grade.
In 1990-1992 East Africa had the lowest percentage of children persisting up to the last grade (37%), while Southern Africa had the highest retention of 62%. During 2008-2010 both Southern Africa and East Africa retained their ranks as first and last respectively. Although East Africa is at the bottom, it had a good increase in the percent change of the number of children enrolled in primary school who persist to the last grade (33%), while West Africa had the highest percent change (38%) of retaining children in school till the last grade.

It is apparent that all the West African countries under observation during 2008-2010 emerged as good performers by retaining over 50% of their children in school until the last grade, while East African countries emerged as the worst performers with most of them having retention rates below 50%. The pattern of performance in retaining children at school is worth noting, West African countries like Benin and Mauritania have risen from 23% and 36% in 1990-1992 to 56% and 71% retention in 2008-2010 respectively, while East African countries experienced a decrease in the number of children persisting to the last grade (Mozambique 36%-31%, Rwanda 39%-37% and Burundi 57%-53%). The reasons for children dropping out of school have been discussed in Chapter 5, section 5.4.1 Table 5.13 and Figure 5.7.

(iii) *Resources for good care*

Under resources for child's and women's good care we investigate the regions' performance according to the gender parity index and the ratio of female to male labour force participation rate, with both indicators being used as proxies for women's status. The outcome of the gender parity index across the regions of Sub Saharan Africa in 1990-1992 ranged from 64% in West Africa to 100% in Southern Africa. In 2008-2010, Southern Africa still retained the first rank of 100%, while West Africa improved from 64% to 91%, recording the highest percent change of 43%. Central Africa had the lowest gender parity index of an average of 75%, however Chad in Central Africa recorded an improvement from 41% to 64%.

The ratio of female to male labour force participation rate is used as a proxy for women`s access to resources that can facilitate both their own care and that of their children. West Africa had the lowest ratio in both periods, but at the same time the second highest percentage change of 17% next to Southern Africa with a percentage change of 18%. East Africa had the highest ratio of female to male labour force participation rate of 91% in

1990-1992 and 93% in 2008-2010. There are better ratios between female and male primary school enrolment (the gender parity index) in comparison to the ratio of female to male labour force participation rates.

(v) *Resources for good health*

Child wellbeing largely depends on the availability of resources for good health such as good sanitation, good shelter, a good environment and availability of health services. We have used health expenditure to explain health services, however there is a paucity of data on health expenditure. For instance, in Central Africa, East Africa and West Africa there were no data during 1990-1992. Lack of data during the period in question makes it impossible to compare the performance between the two periods under study or to gauge the percentage change. Southern Africa which has data for both periods showed no change in health expenditure. In 2008-2010, Southern Africa had the highest total health expenditure per capita (8%), while Central Africa had the lowest health expenditure (4%). The East African region performed better in committing resources to health expenditure when compared with West Africa and Central Africa.

Table 6.6 indicates that in 1990-1992, only 13% of the Central African rural population had access to improved sanitation facilities, while in the same period, 43% of the Southern African rural population had access to improved sanitation facilities. Regional averages have concealed the disparity between South Africa's and Botswana's performance in rural sanitation. They each had 62% and 23% access to improved sanitation, respectively. Lesotho has missing data. Only 11% of West Africa's rural population had improved sanitation. In 2008-2010, West Africa still had the lowest proportion (17%) of its rural population with access to improved sanitation. Southern Africa retained its position as the highest in improved rural sanitation (44%), but recorded the lowest percentage change (3%), whereas East Africa recorded the highest percentage change (84%), followed by West Africa with a percentage change of 52%.

(vi) Resources for good education

We used female primary school teacher, paved roads and persistence to the last grade to gauge resources for good education. Going back to Table 6.6, in 1990-1992 Central Africa, only 23% of primary school teachers were female, which increased to 31% in 2008-2010 with an increase of 8% and a percentage change of 35% which was the highest across the four regions under study. Southern Africa had the highest percentage of female primary school teachers in both periods (69% and 76%, respectively). Table 6.6 shows that during 2008-2010 West Africa had the bottom position with 30% of primary school teachers being women. Countries with below 20% of female teachers were Togo, Central African Republic, Chad and Benin, while those with above 60% were South Africa, Lesotho, Botswana and Mauritius. The above-mentioned countries with above 60% female primary school teachers happen to belong to the lower middle income countries in Sub Saharan Africa, thus the higher percentages of female teachers could be partly attributed to marginalisation from other employment, the common association of preschool and primary school teaching jobs to be women's work and the cultural belief of women being responsible for younger children.

Paved roads are a proxy for proximity of schools, lack of all-season roads in remote areas largely influences decisions as per children's enrolment in school such as either to enrol at a later age or not enrol at all. Central Africa had the lowest percentage of paved roads (8%) in 1990-1992, but made a remarkable improvement to

17% by 2008-2010. This was a 9% increase and a 113% change which turned out to be the highest percentage change in any of the regions. Mauritius is the reason behind East Africa featuring as the best performer because it stands out among all the Sub Saharan African countries with the highest percentage of paved roads in both periods (93% and 98%, respectively).

(vii) *Resources for food availability and accessibility - Crop Production Index (CPI)*

Children's access to nutritious food largely depends on the availability and affordability of food. The crop production index answers to issues of both food availability and affordability for it indicates the level of crop production and reflects changes in the production volume. Central Africa showed the highest crop production of 78% in1990-1992, while West Africa showed the lowest with 59%, but with a notable percentage change of 105%. The outlook of the performance of Sub Saharan African regions and countries in crop production is promising. All the countries registered increases in crop production from 1990-1992 to 2008-2010 with the exception of a few countries like Mauritius, Botswana, Republic of Congo that recorded decreases, while Burundi and Lesotho recorded very weak increases.

(viii) *Rural household income*

Household income is crucial in facilitating access to the necessary resources for children's wellbeing.

We use agricultural value added and female employment in agriculture as proxies for rural household income. Table 6.6 reveals that all the regions of Sub Saharan Africa registered a decrease in the percentage of female employment in agriculture. Southern Africa had the lowest percentage of women employed in agriculture as well as the highest percentage change in the negative (-15%). East Africa turned out to be the best performer in both periods (1990-1992 and 2008-2010) and at the same time recorded the lowest decrease of -3% change. Out of the 30 countries under observation, the comparison of the periods 1990-1992 and 2008-2010 reveals that 23 countries registered a decrease in the percentage of females employed in agriculture, and only seven countries registered an increase in the number of women employed in agriculture (Appendix 1, Table 2). Why are countries registering declining numbers of rural women employed in agriculture? It is probable that a lack of access to productive resources such as land, livestock, technology, improved seeds, fertilizer, credit and extension services have largely contributed to the declining percentages.

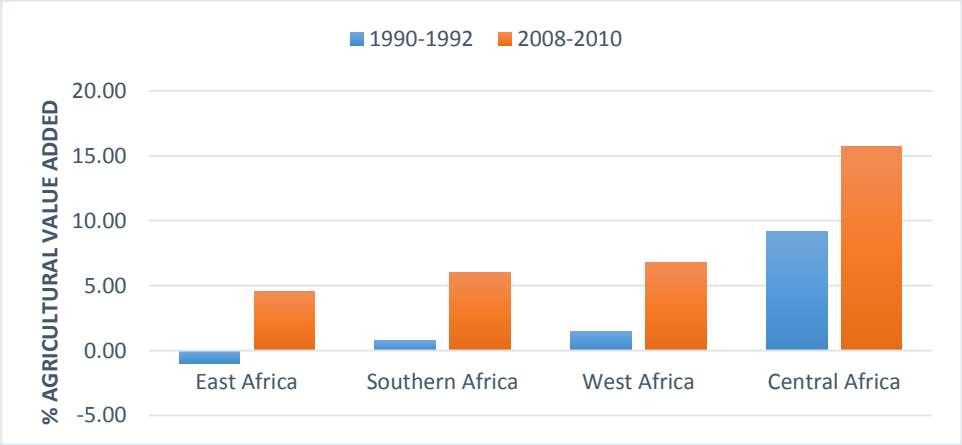


Figure 6.4 Comparison of the performance of regions of SSA in agricultural value added between 1990-1992 and 2008-2010

Data source: Author's calculations

Figure 6.4 indicates that agricultural value added was considerably lower during 1990-1992, to the extent that the East African region registered a negative growth rate of agricultural value. This was due to negative output in Zambia -12.27%, Mozambique -7.39%, Malawi -4.19% and Kenya -0.19%. Southern Africa and West Africa had less than 2% growth, while Central Africa performed far better by scoring 9.17% growth. The good performance of Central Africa can be attributed to the Republic of Congo, the results for which were outstanding, being far above the rest of Sub Saharan African countries with growth rates of 40.68% and 45.93% in the successive period (2008-2010). During 2008-2010, agricultural value added registered positive growth in all Sub Saharan African regions. Some countries' performance took big strides from negative to positive growth rates. For example, Gambia -1.27% to 16.31%, Senegal -3.13% to 12.18%, Mozambique -7.39% to 10.16% and Lesotho -0.70% to 7.35%.

(ix) Accessibility to productive resources

Rural household income largely depends on the household's accessibility to productive resources such as human, physical, natural, financial and social resources. We use female enrolments in vocational secondary education as a proxy for human capital. Ethnolinguistic fractionalisation and the ratio of the female to male labour force participation rate have already been explained, and both can be used as a pathway for accessing financial capital. Sub Saharan African women, particularly rural women are generally economically vulnerable. Therefore, investment in the productivity and skills of women has the positive effect of raising their incomes and thereby reducing not only child poverty, but poverty in general. Female enrolment in vocational secondary education is a pathway to improving their productivity and skills, despite the importance attached to this type of education and training, several countries either have missing data or have recorded very poor performance.

The findings in Table 6.6 of Sub Saharan Africa as regions reveal that investments in female vocational secondary education are far from achieving the benefits of vocational training. Comparisons across the regions during 1990-1992 imply that West Africa had the lowest proportion of women enrolled in vocational secondary education (25%) while Southern Africa had the highest (53%). During 2008-2010 there was some improvement as compared to the first period in most regions, with the exception of Central Africa which was not only at the bottom but also registered a decline from 41% in 1990-1992 to 37% in 2008-2010 of women enrolled in vocational secondary education. While Southern Africa took the lead in 1990-1992 with 59%, it maintained its leading position in 2008-2010 but with a decline to 53%. It is notable that although West Africa is mostly behind the other regions, its percentage growth between 1990-1992 and 2008-2010, was mostly far ahead of the other regions. For instance, it recorded 88% growth in female vocational secondary education enrolment, while Southern Africa, the leading region, recorded a decrease in percentage growth to 10%. The overall performance suggests that female enrolment in secondary vocational education in Africa is progressing at a very slow pace, far behind the escalating rates of child poverty.

(x) Political, economic and social cultural institutions

We have been making comparisons of the performance of African regions in factors that have a determinant impact on child poverty. At the apex of our conceptual framework in Figure 3.1 in Chapter 3 is the under-five mortality rate, a barometer of child wellbeing, and we have walked through respective determinants which at different points in the Figure, act as either dependent or determinant factors of child poverty. We now come to the bottom of the Figure, with political, economic and social cultural institutions as the foundation on which dependent and determinant factors of child poverty are founded. Going back to Table 6.6, Ibrahim's Index of African Governance began in 2000 and thus its performance cannot be compared to the first period.

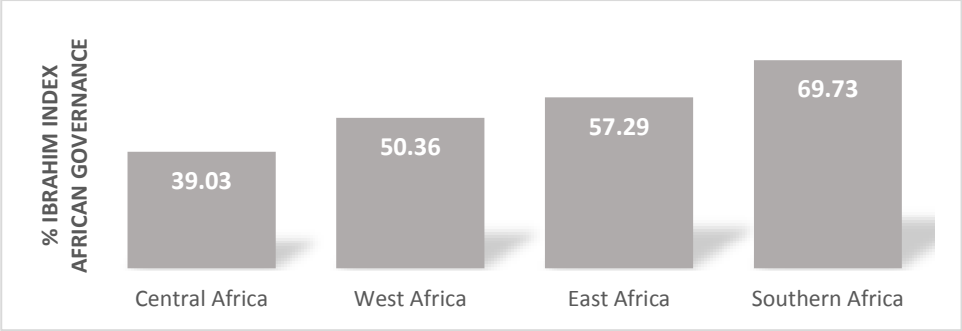


Figure 6.5 Performance of institutions across regions of Sub Saharan African during 2008-2010

Figure 6.5 portrays a big difference of 31% between Southern Africa (the best performer: 70%) and Central Africa (the worst performer: 39%) in institutional quality, while the difference between Southern Africa and East Africa is about 12%. The difference between Southern Africa and West Africa, which is second last, is about 19%.

(xi) Overall comparisons of the performance of regions of Sub Saharan Africa in child poverty

The present subsection sums up the overall performance of regions of Sub Saharan Africa in factors affecting child poverty in the whole period under study (1990-2010).

Table 6.7 Summary of the performance of regions of SSA in factors affecting child poverty in averages1990-2010

Region	Central	East	Southern	West
YEAR	1990-2010	1990-2010	1990-2010	1990-2010
Under Five Mortality Rate	13.97	12.77	7.65	15.25
Neonatal Mortality Rate	38.08	35.76	32.94	38.59
Underweight Children	21.39	23.40	13.18	25.31
Preschool Enrolment	8.41	37.11	32.41	8.61
Enrolment Primary School	61.81	78.47	80.69	59.86
Persistence to Last Grade Primary	46.76	48.79	68.73	58.56
Out of School Children	38.19	21.53	20.61	40.16
Enrolment Ratio-Gender Parity Index	72.89	90.88	100.00	76.89
Female Primary School Teacher	28.11	46.54	76.41	27.73
Female Employment in Agriculture	65.00	73.42	31.97	56.21
Rural Sanitation	19.52	37.30	40.42	14.16
Health Expenditure Per Capita	4.14	5.85	8.29	5.25
Paved Roads	7.68	37.72	21.88	19.62
Ibrahim's Index of African Governance	37.71	55.65	68.32	48.99
Ratio of Female to Male L.F.P.R.	84.74	98.28	78.31	70.00
Crop Production Index	92.46	90.68	95.51	87.05
Female in Sec. Vocational	37.95	36.73	48.04	35.79
Agricultural Value Added	11.17	3.12	1.22	3.28
Wood Fuel	2.11	2.85	4.11	4.12
Mobile Phone Subscribers	34.92	26.38	62.91	36.17
Age 0-14(% Male Population)	44.71	47.04	42.31	43.31
Age 0-14(% Female Population)	43.67	45.55	40.41	42.04

Southern Africa has been the best performer in terms of the U5MR, however the region wise comparison does not portray the performance of all the countries it represents. For instance, as a matter of fact, the country with the lowest average U5MR is not from Southern Africa, but is from East Africa (Mauritius, with a rate of only1.85%). West Africa retains the position of worst performer as it was in the comparisons of sub periods (1990-1992 and 2008-2010). Southern Africa again turns out to have the lowest percentage of underweight children (13.18%), while West Africa has the highest (25.31%). The percentage of preschool enrolment in Sub Saharan Africa is alarmingly low particularly in Central Africa and West Africa both of which had less than 10% of their preschool age going children enrolled at school. Between 1990 and 2010, West Africa and Central Africa regions have almost double the percentage of children out of school in comparison to East and Southern Africa. The total averages of the gender parity index across the regions appear to be over 70%, but country averages reveal some countries have a rate below 70%. West Africa and Central Africa women represented less than 30% of their primary school teachers. There is a wide disparity in female employment in agriculture across Sub Saharan Africa, with Southern Africa having the lowest percentages and East Africa the highest.

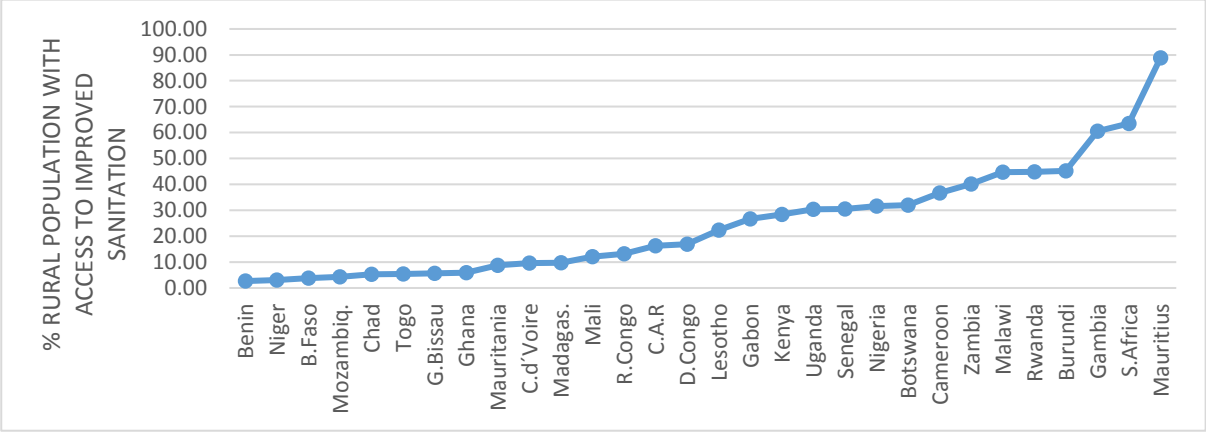


Figure 6.6 % averages of rural population between1990-2010 with access to improved sanitation. Source: Author's calculation

West Africa and Central Africa had below 20% of their rural populations with access to improved sanitation. Improved rural sanitation is a major obstacle to child wellbeing in Sub Saharan Africa, and only Gambia, Mauritius and South Africa have over 50% of their rural population with access to improved sanitation. Eleven out of 30 countries had less than 10% of their rural population with improved sanitation.

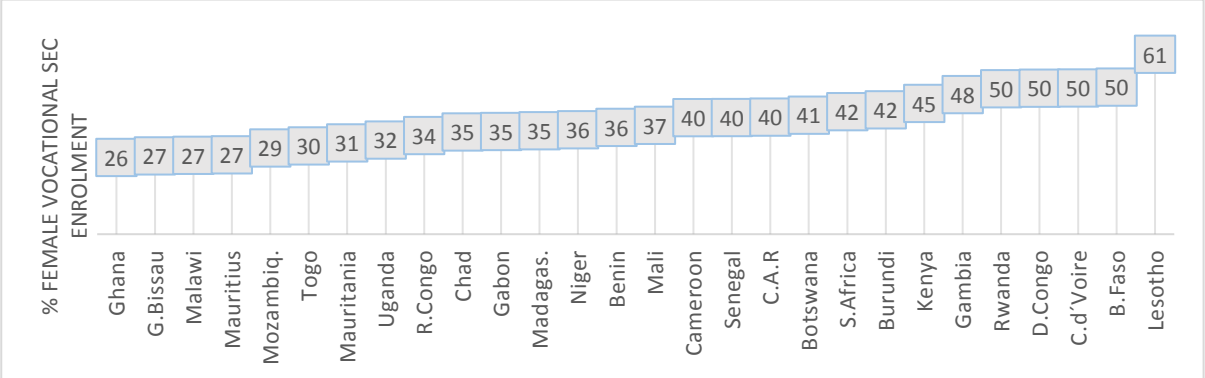


Figure 6.7 % averages of female enrolment secondary vocational education 1990-2010 in Sub Saharan Africa. Data source: Author's calculations.

The total averages of female enrolment in secondary vocational in Figure 6.7 depicts Ghana as having the lowest average of 26% and Lesotho with 61% as having the highest enrolment rate. The figure portrays that the differences between enrolment rates of adjacent countries is not much, thereby generating a smooth slope rising gradually.

Conclusion.

The results indicate that differences between low income and lower middle income countries, and U5MR above 10% and U5MR below 10% in terms of child poverty issues suggest that strategies to reduce the U5MR should give due importance to women in agriculture (but has a wrong expected sign), women's access to credit channelled through women's groups (ELF), children's nutritional status (CU) and women's status (GPI). These findings apply more to low income countries and U5MR above 10% countries because they have shown higher elasticities.

Results of equation 2 on primary school enrolment show that efforts to increase the primary school enrolment in Africa should give due importance to issues of child poverty (U5MR) and child underweight, particularly in lower middle income countries and U5MR below 10% countries. It is normally assumed that the consequences of child mortality and child underweight are mostly associated with poor income countries. However, child mortality and child underweight can be experienced alongside economic growth partly because women's lack of access to land reduces the numbers of women in agriculture as they turn to other low paying jobs which are more available in lower middle income countries as compared to lower income countries. The other reason is the issue of income redistribution. U5MR elasticity of primary school enrolment is moderate in the lower GNI cluster and U5MR above 10% cluster. The Ibrahim Index African Governance elasticity of primary school enrolment is relatively high across the clusters with the exception of the cluster of U5MR above 10%. Crop production index elasticity of PSE is very high in the lower GNI cluster and U5MR above 10% cluster but has moderate effect in the lower middle income and U5MR below 10% cluster.

The crop production index elasticity of child underweight in lower and lower middle income countries and U5MR above and below 10% countries, female enrolment in secondary school elasticity of child underweight in lower income countries, lower middle income countries (but with wrong sign) and U5MR above 10% countries suggests that strategies to reduce child underweight should focus on crop production and female enrolment in secondary school, particularly vocational schools. Vocational secondary schools produce graduates with skills that make them ready to join the labour market. In sum, the regression results of U5MR, primary school enrolment and child underweight tend to point to agriculture as a solution to child poverty issues in Africa. This is through an enabling environment for women in agriculture to access productive resources such as credit and education which would contribute to better crop production. Out of the four clusters: lower GNI, lower middle GNI, U5MR above 10% and U5MR below 10%, the results suggest that the lower GNI cluster and U5MR above 10% explain better the factors affecting child poverty as compared to the lower middle GNI and U5MR below 10% clusters. The similarity between the lower GNI cluster and U5MR above 10% cluster is because all the 15 countries in the lower GNI cluster form part of the 23 countries in the

U5MR above 10% cluster. There is a common pattern that from the 15 countries with U5MR above the total average, 11 of them have GPI below the total average, 14 have above the total average of OOSC and below the average of primary school enrolment, 11 have CU above and IIAG below the total average.

Results of region wise performance indicate that between1990-1992, Southern Africa had the lowest U5MR, while West Africa had the highest U5MR. In 2008-2010, U5MR and child underweight declined across Sub Saharan Africa, as compared to 1990-1992. East Africa had the highest percentage change reduction in child mortality, and at the same time, it recorded the second lowest U5MR. Although West Africa had the highest proportion of underweight children, at the same time, it recorded the highest reduction and percentage change.

Southern Africa had the highest primary school enrolment in 1990-1992, while West Africa had the lowest. During 2008-2010, the East African region took the lead, while West Africa had the lowest rate of primary school enrolment but had a remarkable percent change. The primary school enrolment rate has largely improved across Sub Saharan Africa, but the issue is how to retain children at school until the last grade. In 1990-1992 East Africa had the lowest percentage of children persisting to the last grade, while Southern Africa had the highest retention rate. During 2008-2010, Southern Africa and East Africa maintained their ranks as first and last respectively. Apparently, all the West African countries under observation during 2008-2010 emerged as good performers by retaining over 50% of their children at school until the last grade, while East African countries emerged as the worst performers with most of them having below 50% and some countries experienced a decrease in the number of children persisting to the last grade. The percentage of preschool enrolments in Sub Saharan Africa is alarmingly low, particularly in Central Africa and West Africa. These regions also have almost double the proportion of OOSC in comparison to East and Southern Africa.

The majority of Africa's rural population have no access to improved sanitation, West Africa had the lowest percentage in both periods, while Southern Africa had the highest percentage of the rural population with access to improved sanitation, but it recorded the lowest improvement with a percentage change of 3%, whereas East Africa recorded the highest percentage change of 84%, followed by West Africa with a percentage change of 52%.

In terms of resources for education, Southern Africa was the best performer and West Africa held the bottom position. Concerning resources for food availability and accessibility – Central Africa had the highest crop production while West Africa had the lowest in 1990-1992. The outlook of the performance of Sub Saharan African regions and countries in crop production is promising, and all registered an increase in the period 1990-1992 to 2008-2010 with the exception of a few countries. All the regions of Sub Saharan Africa registered a decrease in the percentage of women employed in agriculture. The declining numbers of women employed in agriculture is probably due to a lack of access to productive resources. The pattern of institutional quality (IIAG) shows a wide disparity between Southern Africa the best performer (70%) and Central Africa the worst performer (39%).

7. CONCLUSIONS

"Most of the people in the world are poor, so if we knew the economics of being poor we would know much of the economics that really matters. Most of the world's poor people earn their living from agriculture, so if we knew the economics of agriculture we would know much of the economics of being poor" (Shultz, Nobel Prize for Economics in 1979).

Previous studies on child poverty have had a tendency to focus on child poverty in general with minimal attention being paid to children living in poverty in rural areas, who in most cases happen to be the majority. Maternal nutrition is intimately intertwined with infant health and survival right from the foetal stage and through infancy. The kind of prenatal care a mother receives, the birthing care and the neonatal care for both the baby and mother mostly depends on the financial status of the mother and yet the link between mother's poverty and child poverty has not been given due importance in the precedent studies. More attention has been paid to women's education and health with minimal attention being given to their availability and accessibility. However, to have good health and education largely depends on the availability of these facilities and the means to access them which mostly depends on the well-functioning of respective institutions that determine the availability and accessibility of these services. Child participation in making decisions on issues that affect them is largely absent. Instead, most of the knowledge on child wellbeing is based on adults and institutional requirements, and this has been done at the expense of real situations which are best known by the children living in poverty. This has resulted in the development of indicators and interventions which in some ways are irrelevant to child poverty solutions. Although education is discussed, most attention has been on primary school, with few insights into preschool education. Female primary and secondary education have been stressed but little has been mentioned about women's literacy. And finally, in-depth analysis of the relationship between education, health and child poverty is largely missing from the literature.

There is need to expand the literature on child poverty and to compensate for the missing parts because as mentioned above, the majority of poor children live in rural areas. It should be noted that the socioeconomic factors common to children in poverty in rural areas are not the same as those of children in poverty in urban areas and thus solutions to the problems of the two groups have to be tailored to their specific needs. The consequences of low birth weight[9], and children with underdeveloped cognitive ability are factors which are mostly irreversible and they negatively affect a child's health, leading to poor performance at school. The impact of these factors may carry on into adulthood and in the process, affect his/her income earning prospects, consequently creating a vicious cycle of transgenerational poverty. These matters call for due attention to be given to mother's wellbeing. Our focus on child poverty is important because poverty causes lifelong damage to children's minds and bodies, turning them into victims of adulthood poverty. This study revisits child poverty by giving education its rightful position as a solution to most of the other child deprivation indicators. A body of studies (Appleton et al. 2009; EFA 2013; Botha 2010) explain the lack of education in general

[9] due to the mother´s malnourished status.

(without detailed specifics) as one of the causes of child poverty. This study takes this point further through econometric analysis to show that it is not only education, but also the multidimensional nature of child poverty that calls for analysis of factors that interact with education in child poverty issues.

Our objective is to analyse factors affecting child poverty by finding answers to the research questions (1) Which are the most important variables affecting child poverty? (a) Identify country clusters of African countries based on their factor scores in the most important variables affecting child poverty (2a) Does a lack of access to education cause child poverty or does child poverty cause a lack of access to education? Or both and to what extent? (2b) To what extent can the low status of rural women be considered to be a contributing factor to child poverty? More particularly what is the impact of women's low status on children's health and education status? (3) What progress has there been in child poverty issues in Sub Saharan African? Are there any differences between (a) lower income and lower middle income countries, high U5MR and low U5MR countries (b) region wise differences?

The search for answers starting with the first question began with the help of the child perspective deprivation approach to identify children living in poverty and it found that a majority of African children lack access to good shelter and sanitation. Due to the nature of multiple interdependencies among factors affecting child poverty, the principal component analysis (PCA) statistical technique was applied to eliminate redundant variables and to retain those (most important variables) that explained most of the variations in the dataset. Variables describing women's low status such as wife earning less than husband, women's low participation in making major decisions in households, women's limited access to land and credit, women's low education level and poor health status are loaded heavily on principal components that accounted for the major variations in the dataset. Children with a birth certificate (a proxy for child participation in matters concerning their wellbeing) is loaded heavily on the sixth component (named assets and participation). Another variable in this component is households with a radio, pointing to the crucial role of information in creating awareness in children of their rights. Wealth quintile has also been loaded onto this component, for household income facilitates families to possess a radio and access other child capability building factors, for instance. The important variables identified were used in both descriptive and econometric analysis.

The variables useful for explaining child poverty for which we did not have data for the whole period under study, were analysed with the help of descriptive analysis. The answer to the second question using descriptive analysis found that the school attendance of students aged 6-10 and 11-15 was declining. The reasons contributing to children being out of school are poverty (lack of money to pay school fees), dislike of school and poor performance in exams. The multiple determinants of educational access often intersect with each other, resulting in a complex of mutually reinforcing barriers to schooling consequently trapping out-of-school children in a web of multiple deprivation factors which exacerbate the vicious cycle of child poverty. For instance, if a child who is out of school is characterised as being from a poor family, thus unable to pay school fees, has an illiterate mother who cannot help with homework (contributes to failing exams), is a dropout (did

not like school probably because of lack of school inputs due to poor funding), is rural and is a girl (sex), she is likely to face more difficulties in ever returning to or going to a conventional school. In contrast, a child who is characterised as being an urban boy belonging to a family from the highest wealth quartile, and has a literate mother, he turns out to have better chances of going to or getting back to a conventional school.

The socioeconomic indicators of the status of women identified by PCA as important factors affecting child poverty are education, illiteracy, participation in decision making, land ownership, access to credit, employment, earnings, nutritional status and access to health facilities. Results of descriptive analysis using the important indicators of rural women's status identified to answer the second question found that: (a) The U5MR are higher in households where women have no final say in decision making as compared to households where women have a final say in at least three decisions. (b) The highest percentage of underweight children are those who are born very small followed by mother's nutritional status, and mothers with body mass index below 18.5 accounted for 31% of the underweight children. (c) Mothers without education had 23% of underweight children in comparison to mothers with secondary or higher education who had 12% of underweight children. (d) Despite the fact that Sub Saharan African women produce 60-80% of the continent's food, including both subsistence and market food, descriptive results reveal that of all the countries under observation, only Niger has more than 15% of its women owning land. The rest of the countries have women land ownership below 15%, with some like Gambia, Nigeria and Togo having rates of 5% and below. (e) There is a great gender inequality in both skilled and unskilled labour at all levels of education as well as in terms of wealth quartiles.

The only occupation with higher percentages of women at all levels as compared to men is the household and domestic occupation. These findings suggest that besides education, there are other factors that contribute to high gender inequality in the labour market. (f) A large percentage of women, particularly rural women, reported that they could not access health facilities due to lack of money, the long distance to the nearest health facility and lack of transport due to poor infrastructure. While a small percentage reported other factors such as lack of knowledge about the health centre, the need to get permission from their husbands and the health facility not having female personnel. (g) Rural children are largely underweight as compared to urban children, at the same time there is a higher percentage of U5MR among rural children than among urban children. There are higher percentages of rural women without access to productive resources in comparison to urban women.

Attempts to answer question 2 that "are children poor because they cannot access education or do children lack access to education because they are poor" using an econometric model suggest that the causality between child poverty and lack of access to education is bi-directional. Although education plays a crucial role in the pathway out of poverty, the order of elasticity ranking shows that female employment in agriculture, ELF and child underweight are more potent in explaining child poverty than primary school enrolment (education). As much as child poverty (U5MR) plays a determinant role in children's access to education, the elasticity ranking

indicates that the effect of child poverty on primary school enrolment is not as potent as that of the crop production index, child underweight, ratio of female to male labour force participation rate and Ibrahim Index African Governance. However, these factors are mostly influenced by child poverty, suggesting that the indirect effect of child poverty on primary school enrolment is stronger than the direct effect. For instance, child underweight is generally associated with children from poor families. The results suggest that child poverty is statistically significant in explaining lack of access to education and the null hypothesis is rejected at 0.01 level. Descriptive analysis found similar results that lack of capacity to pay school fees is one of the major reasons for children not being at school.

The crop production index elasticity of child underweight takes the first position, followed by female enrolment in secondary vocational education elasticity of child underweight. Wood fuel[10] takes the third position, while primary school enrolment elasticity of child underweight is fourth. A 1% increase in any of these (with the exception of wood fuel) corresponds to a decrease in the percentages of child underweight. The low status of women (the gender parity index) and education (primary school enrolment) are significant in explaining child underweight and the null hypothesis is rejected at 0.01 level.

From our findings, both access to education and women's access to productive resources are crucial factors in explaining child poverty. However as much as education is important, it takes resources such as good health and school inputs before enrolling in free universal primary school. Based on the econometric analysis results, the answer to the second research question is that the low status of women affects child poverty to a large extent. Rural women's access to productive resources takes pre-eminence by laying a sound foundation for education boosting factors to create a virtuous cycle of growth. Our findings suggest that child poverty (U5MR) could be reduced largely through the improved status of women in agriculture, while increased crop production leads to increases in primary school enrolment and reductions in the proportion of underweight children. Women in agriculture elasticity of U5MR and crop production elasticity of primary school enrolment are in the lead in elasticity ranking, implying that strategies to reduce child poverty and increase education should focus on creating an enabling environment for women in agriculture which in the process will increase agricultural output which positively affects education. Elasticity ranking shows that what is at issue is not the impact of education on reducing child poverty or the impact of child poverty on reducing education, but the improvement of women's status, particularly in the agricultural sector.

The findings from the simultaneous equations reveal that the gender parity index is the only variable that is common across the three equations and is statistically significant in all three equations with modest elasticity ranking both in the U5MR and primary school enrolment but with minimal elasticity ranking in child underweight. Child underweight and girls out of school are common to both U5MR and primary school

[10] a proxy for shelter, the burning of wood fuel pollutes the air particularly in a congested house without ventilation, this consequently risks the health of the children in the household.

enrolment. Primary school enrolment and ELF are common to both U5MR and child underweight. Out of the variables that are unique to each dependent variable, the following have the most potent impact: female employment in agriculture on U5MR; the ratio of female to male labour force participation rate on primary school enrolment; and female enrolment in secondary vocational education on child underweight.
The answer to the third research question suggests that strategies to reduce the U5MR should give due importance to women in agriculture (but has a wrong expected sign), women's access to credit channelled through women's groups (ELF), children's nutritional status (child underweight) and women's status (gender parity index). These findings apply more to lower income countries and U5MR above 10% countries because they have shown higher elasticities as compared to lower middle income countries and U5MR below 10% countries.

Efforts to increase the primary school enrolment in Africa should give due importance to the crop production index since its elasticity of PSE is very high in the lower GNI cluster and U5MR above 10% cluster but has a moderate effect in the lower middle income and U5MR below 10% cluster. In the quest for an increase of primary school enrolment in lower middle income countries and U5MR below 10% countries there is need to give particular attention to issues of child poverty (U5MR) and child underweight. It is normally assumed that the consequences of child mortality and child underweight are mostly associated with lower income countries. However, child mortality and child underweight can be experienced alongside economic growth partly because women's lack of access to land and other productive resources reduces the numbers of women in agriculture as they turn to other low paying jobs which are more available in lower middle income countries as compared to lower income countries. The other reason is the issue of income redistribution. The U5MR elasticity of PSE is moderate in the lower GNI cluster and the U5MR above 10% cluster. The Ibrahim Index African Governance elasticity of primary school enrolment is relatively high across the clusters with the exception of the cluster of U5MR above 10%.

The estimate of crop production index elasticity of child underweight in the lower and lower middle income countries; and U5MR above and below 10% countries; and the estimate of female enrolment in vocational secondary school elasticity of child underweight in lower income countries, lower middle income countries (but with wrong sign) and U5MR above 10% countries suggests that strategies to reduce child underweight should focus on crop production and female enrolment in secondary school, particularly vocational schools. Vocational secondary schools produce graduates with skills that make them ready to join the labour market.

Out of the four clusters: lower GNI, lower middle GNI, U5MR above 10% and U5MR below 10%, the results suggest that the lower GNI cluster and U5MR above 10% explain better the factors affecting child poverty as compared to the lower middle GNI and U5MR below 10% clusters. The similarity between the lower GNI cluster and U5MR above 10% is because all the countries in the lower GNI cluster are among the countries in the U5MR above 10% cluster. A majority of countries with U5MR above the total average tend to display a

common pattern of having GPI below the total average, OOSC above the total average, primary school enrolment below the total average, CU above the total average and IIAG below the total average.

Results of region wise performance indicates that between1990-1992, Southern Africa had the lowest U5MR, while West Africa had the highest. During 2008-2010, U5MR and child underweight declined across Sub Saharan Africa, as compared to 1990-1992. The primary school enrolment rate has largely improved across Sub Saharan Africa; however the issue is how to retain children at school until the last grade. In both periods (1990-1992 and 2008-2010), East Africa had the lowest percentage of children persisting to the last grade, while Southern Africa had the highest retention. Sub Saharan Africa in general has very low rates of preschool enrolment, particularly in Central Africa and West Africa. These regions also have almost double the percentage of OOSC in comparison to East and Southern Africa.

The majority of Africa's rural population have no access to improved sanitation, and Southern Africa was the best performer in terms of having the highest percentage of the rural population with access to improved sanitation and good resources for education, while West Africa took the bottom position in both periods. The outlook for regional performance in crop production is promising, with all registering an increase in 2008-2010. It is notable that all regions of Sub Saharan Africa registered a decrease in the percentage of female employment in agriculture, and this decline can probably be attributed to women's lack of access to productive resources. It is remarkable that despite the fact that the West African region tends to be at the bottom in performance, it mostly records the highest reduction and percentage change in most of the variables under study. There is a wide disparity in the pattern of institutional quality between Southern Africa, the best performer (70%) and Central Africa, the worst performer (39%).

Country overall performance in child poverty determinants reveals that countries with a high gender parity index had the lowest U5MR. Countries with the highest primary school enrolment had the lowest child underweight. Countries with high institutional quality and countries with a high gender parity index had the highest school enrolment. Countries with low institutional quality had the highest U5MR, child underweight and lowest primary school enrolment.

The contributions of the study can be explained in the following way: For instance, we expand on the previous research by adding the need to improve on the quality of institutions particularly those concerned with budget allocation, to shift high investments away from tertiary sectors to primary sectors which tend to serve the needs of a large proportion of poor children and their families. Previous studies have generally stressed the need for preschool education, and the present study has revisited child poverty and fits around the work of previous researchers and extends them by showing the interconnectedness between preschool enrolment and both child underweight and OOSC. We have done this with the help of a table that shows countries with low percentages of preschool enrolment rates mostly have high percentages of underweight children and high percentages of OOSC. Low rates of preschool enrolment particularly of underweight children who are mostly associated with

underdeveloped cognitive skills which negatively affects children's achievement later in life as they fail to reap the full benefits of education.

Our findings that children's dislike of school is one of the major reasons for children being out of school adds new depth to the literature on the factors affecting child poverty. This calls for more research on what should be done to make schooling become something that most children look forward to going to during school days. Previous studies on child poverty have mostly focused on the conventional multidimensional child deprivation indicators such as food, water, education, sanitation, shelter, information and health in general. We have added to the conventional multidimensional indicators child specific indicators – OOSC, child marriage, orphans and children in employment; and general indicators including women's status and institutional quality in describing the plight of children.

We have contributed to the earlier studies on child poverty by bringing on board agricultural productivity. A combination of regression results and theory suggests that agricultural production which is a labour-intensive sector is the password for child poverty reduction particularly in rural Africa. Africa's poor are predominantly rural and because their livelihood is based mainly on subsistence farming, agriculture is their lifeline. Increased agricultural productivity acts both as a source of increased food availability and income for farmers. It enables farmers to increase their household consumption expenditure which consequently improves children's nutritional status and subsequently augments school enrolment rates thereby reducing OOSC and in the long run, reduces both child and adult poverty.

Our study offers new insights to the consensus of the importance of female education. Under principal component analysis, women who are literate loaded heavily on the component named women's education. We thus filled an existing gap caused by situations whereby girls either drop out of school or never enrol at all and eventually grow up into illiterate adults ending up as illiterate mothers, thereby defeating the target of both improving child wellbeing and the reducing child poverty. We add to earlier findings by showing that women who failed to attend school can still have a positive effect on their children's wellbeing by attending adult literacy classes. However female education by itself is not sufficient to improve child's wellbeing but other factors contributing to better women status matter as well.

Simultaneous regression analysis of the endogenous variables of the U5MR, primary school enrolment and child underweight adds to the ongoing research on the multidimensional nature of child poverty. Solutions to child poverty cannot focus on getting children enrolled in school without considering efforts to resolve children's poor health status caused by factors such as malnutrition. Good health status can only be maintained with the right information and resources which can be acquired through the channel of education.

In summary, this study has given a new interpretation of child poverty by applying the established theory of child deprivations in a new setting to add to the existing studies on child poverty. We have done this by showing

the effect of women's limited access to productive resources such as education, participation in decision making, land ownership, credit, labour market, gender inequality in earnings, health facilities and insufficient access to food leading to poor nutritional status, all these indicators of low status of women have either positive or negative effect on the U5MR, primary school enrolment and child underweight. We have stretched the body of knowledge on child poverty, particularly in Africa where preschool enrolment is still quite low, the rate of school dropout is increasing, female illiteracy rates are on the rise, there are invisible children whose births go unregistered, social cultural institutions still override the constitution of equality, and there are declining percentages of women in agriculture.

Our findings are similar to those of McGregor et al. (2007) who found that poverty is associated with inadequate food availability and other factors which positively contribute to higher percentages of child underweight. McDonald et al. (2013) found that children with anthropometric deficits like child underweight faced an elevated risk of mortality in comparison with children with no deficits. The association between child underweight having a positive effect on the U5MR was also reported by Klasen (2007), who found that a majority of child deaths are associated with child under-nutrition. Our findings of the positive correlation between women's low status and child underweight are similar to those of Smith et al. (2003) who found that women's low status in terms of decision making power relative to men has a significant parallel effect on child underweight, particularly in South Asia and Africa.

The important role education plays in reducing poverty was also reported by Barro and Lee (2010), UNESCO (2012) and Nielson (2006) who found that the majority of African countries lose high percentages of GDP per capita through low investment in primary school education. Conversely Faux and Ntembe (2013) found that primary school education had no impact on poverty in Cameroon, but in the same breath, Appleton (2000) found the effect of education on poverty was insignificant in six African countries. Poverty by itself only partially determines children's access to education. Dieltiens and Meny-Gibert (2008) and Hunter and May (2003) are of a similar opinion that there are other underlying factors that affect children's access to education. Our findings of poor institutional quality having a negative impact on primary school enrolment are similar to those of Rajkumar and Swaroop (2008) who found a negative relationship between public expenditure and educational outcomes. However, Siddique et al. (2016) found that governance had a positive impact on poverty and a negative effect on education because of poor government policies.

Our results on the crop production index having the greatest effect on both primary school enrolment and child underweight, while female employment in agriculture has the greatest effect on child poverty points to the important role of agriculture. These results are similar to the results of Diao et al. (2010), who found that poverty growth elasticities are always higher under agricultural-led scenarios than under industrial-led scenarios. Christiaensen et al. (2011) found that the agricultural food sector was significantly more effective in reducing poverty among the poorest in the bottom wealth quintile.

Our recommendations are as follows. There is need for African governments to shift their focus from prioritising investments in primary school to preschool and this shift would be of great benefit to preschool age children who are out of school, particularly those with cognitive impairment. Child underweight is a major cause contributing to children being out of school, partly because of their underdeveloped cognitive skills. To avoid irreversible damage to the development of undernourished children, an effective preschool curriculum should incorporate school feeding programs as well as stimulation of cognitive development. Preschool lays a better foundation for later achievements at school including achievements in adult life and contributes to lower repetition and dropout rates.

Waiving tuition fees or increasing budgetary expenditure on school inputs or improving other schooling facilities is insufficient in reducing child poverty. There is a need to reinforce school feeding programs as well as investing in other child poverty reducing programs that will enable families to access productive resources.

OOSC should be at the centre of strategies to reduce child poverty and there is a need to subcategorise OOSC in terms of individual child circumstances and their needs. For instance, subcategories like child brides, malnourished children, orphans, and children who study and work require different solutions for getting children into school and to alleviate their suffering. An orphan who is not only underweight but studies and works and eventually gives up on schooling to opt for fulltime work will require different solutions from a child bride who might become a teenage mother.

Child poverty studies should include Africa's invisible children such as the disabled and orphaned children, who mostly have no birth certificates. There is a tendency for these sets of children to miss out on public services, because a birth certificate is one of the requirements before a child enrols in school or accesses most of the publicly provided services.

There is a need to increase the number of private non-profit making schools based on learning outcome-oriented curricula with flexible hours of instructions. Children who work to supplement their families' incomes will not enrol and be retained in a conventional school due to inflexible instructional hours. Child poverty can largely be reduced if this set of children were to be enrolled in private non-profit making schools with flexible hours of instruction. Solutions to malnutrition and instructional hours will most likely cater for the relatively large numbers of orphans, reduce child marriages, minimise the number of OOSC and increase the number of children who combine studying and working and will enable many children to persist to the last grade of primary school with the overall achievement of child poverty reduction.

Women's characteristics affect children's characteristics through the mother's health affecting her children's health, and mother's low status affecting her children's education and overall wellbeing. Mothers' limited access to productive resources is aggravated by their illiteracy which subsequently creates a chain of repercussions that compounds their children's deprived status, as evidenced by this study's findings. Thus, it

is not only children's lack of access to education that increases child poverty in the next generation, but also women's low status such as illiteracy. This connotes that educational strategies to reduce child poverty should comprise both child education and adult multiple literacy programs. Rural women who missed the opportunity to attend primary school can have hope if good quality adult multiple literacy programs are established, ones with curricula that both interest rural women and at the same time meet the needs of the changing labour market. The reduced decision making power of women within households that is due to societal restrictions largely associated with women's illiteracy will lose its ground and thereby substantially reduce child poverty. At the same time, it will improve the status of rural women. There is need to incorporate credit provision with literacy programs, because this would create an incentive for attendance at the same time teach them how to invest gainfully.

There is need for child poverty studies to include the role of institutions in their research undertakings. Our results show that Ibrahim´s Index African Governance has a negative effect on primary school enrolment, and this implies that inefficient public expenditure increases the rates of child poverty in the long run. The positive impact of economic and social cultural institutions on child poverty is more likely to undermine all the other efforts towards the reduction of child poverty, because both regression results and theory point to the focal position of institutions in child wellbeing. Their impact is felt through women's access to resources and public expenditure on basic services.

The well-known benefits of female education per se will not improve the status of women nor enhance the wellbeing of their children, unless complemented with a change of attitudes from social-cultural institutions. We emphasise that it is not enough to highlight economic policies in favour of mothers' education and health. To ensure their success, there is need for them to be backed up by social norms which are expected to be receptive to gender equality in employment opportunities and wages, in accessing credit, in accessing productive inputs and information, in inheritance rights and in power sharing such as in matters of decision making. It is not sufficient to enact laws and policies; their enforcement is of utmost importance, and political institutions have to see to it that these laws are enforced to effect positive changes. Our findings clearly signal to policymakers and all those concerned with child poverty alleviation in Africa, that all said and done, without highlighting reforming of social cultural institutions, reduction of child poverty and for that matter, improved rural women's wellbeing, is far from being accomplished.

Our regression results indicate that the issue is not the impact of education on reducing child poverty or the impact of child poverty on reducing education but the improvement of women's status particularly in the agricultural sector. Thus, we recommend that future studies undertake research on women in agriculture and child poverty to find out how women's role in agriculture can be improved with the object of reducing child poverty.

This study's mission to identify the factors affecting child poverty in rural Sub Saharan Africa faces limitations because of the absence of disaggregated data that address child poverty issues of rural Sub Saharan Africa. A few variables in the study designated to rural Africa in the descriptive chapter are the disaggregated data by residence (rural and urban) on the following variables: reasons for not attending school, U5MR, child underweight, illiterate women and women's access to health facilities. Whereas in the econometric analysis chapter the variables designated for rural Africa are rural sanitation, female employment in agriculture, the crop production index and agricultural value added. Not all the data under observation is child-specific, for instance total health expenditure masks the actual expenditure needed for children's health issues, and it would have been more meaningful if it was targeted at children.

Another limitation which affects the effective application of the results is that regression results could be more revealing if they were based on age-specific children. It would have been better if the data were disaggregated into child age brackets 0-5yrs, 6-10yrs, 11-14yrs and 15-17yrs. For instance, although the effects of child underweight are carried through a child's life, solutions are largely effective when targeted at children in age bracket 0-5. Issues such as primary school enrolment, persistence to the last grade, children OOSC, children in employment and female primary school teachers are mostly applicable to the 6-14 age bracket. However, it should be noted that education has mostly been referred to in this study as a pathway to end childhood poverty from being transformed into poverty in adulthood (transgenerational poverty).

Finally, although the definition of variables in section 5.3.2 indicates that Ibrahim's Index of African Governance is all inclusive by targeting extensive categories, and is keener on capturing outcomes than inputs, performance than promises, it however misses out on child-specific indicators of governance. For instance, comparisons of governance performance across the countries of Africa should be based on child-specific indicators such as the national U5MR adjusted for country income groups (Andrews et al. 2010).

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APPENDIX 1 Table 1 Averages of selected variables 1990-2010

INDEX	U5MR	PSE	CU	GPI	FAG	AGV	HE	RS	OOSC	CPI	PRD	PLG	RFM	IIAG	FPST	MPH	FSV
Benin	14.11	68.67	22.25	63.91	33.81	5.11	4.50	2.67	31.32	84.19	19.00	42.21	76.65	57.92	21.64	38.45	36.42
Botswan	5.81	83.64	13.55	99.34	17.36	-0.43	5.30	31.95	16.35	91.24	29.44	79.60	86.01	74.17	78.45	59.94	40.58
B.Faso	18.08	38.82	31.68	76.57	89.17	4.39	5.94	3.81	61.17	78.83	15.73	61.76	85.27	51.97	27.26	24.08	50.16
Burundi	16.46	59.18	35.16	84.66	96.47	-0.95	7.72	45.19	40.82	100.85	8.00	58.29	101.46	42.06	52.00	9.58	42.41
Cameroo	13.84	83.30	18.27	84.12	68.87	4.00	4.72	36.71	16.70	84.55	12.29	58.18	78.79	45.96	36.71	29.63	39.74
C.A.R	17.03	59.15	25.36	62.54	71.09	2.53	3.97	16.33	40.85	95.98	2.20	43.20	82.50	29.14	16.89	12.11	39.93
Chad	18.90	52.31	32.30	55.48	84.49	1.33	5.27	5.33	47.70	81.44	1.00	34.26	80.12	31.29	9.35	14.53	34.86
R.Congo	17.56	52.61	13.93	72.58	40.25		5.26	13.24	47.40	109.03	2.00	54.97	95.44	39.75	23.86	47.37	33.64
D.Congo	10.88	66.84	29.53	88.29	81.45	2.11	2.63	16.93	33.16	87.23	9.38	56.93	89.93	31.55	40.59	15.61	49.79
C.d´Voir	13.67	55.36	19.78	69.37	56.47	2.78	5.14	9.62	44.64	90.71	9.31	61.69	58.19	40.60	20.95	46.34	49.86
Gabon	8.18	91.82	8.98	96.01	43.83	1.37	3.00	26.65	8.18	96.52	9.23	44.08	81.67	48.59	43.82	64.99	35.02
Gambia	13.17	63.33	18.51	80.34	74.63	3.77	3.87	60.58	36.68	80.46	19.00	59.02	84.61	52.38	31.86	49.42	47.60
Ghana	9.91	66.20	19.86	91.18	53.85	4.55	5.38	5.90	34.06	81.70	21.71	68.16	94.80	65.51	34.58	43.85	26.17
G.Bissau	18.36	58.42	18.63	65.59	66.87		6.04	5.67	41.58	85.35	11.67		81.02	36.30	20.75	31.61	26.70
Kenya	10.05	72.21	17.21	95.97	68.55	2.15	4.39	28.43	27.78	87.74	13.23	72.75	86.20	54.30	43.05	34.41	44.59
Lesotho	10.42	70.76	16.09	99.05	63.08	0.51	8.05	22.35	29.24	105.54	17.00	57.32	82.01	58.08	78.91	34.61	61.36
Madagas	10.27	67.27	36.80	96.29	78.56	2.27	3.56	9.71	32.72	91.56	12.75	38.54	94.21	53.37	56.64	18.11	35.28
Malawi	15.64	96.79	19.96	93.59	79.03	2.52	6.70	44.67	3.21	89.27	45.00	34.07	96.98	55.01	38.62	12.41	26.90
Mali	21.18	54.44	31.17	69.29	66.96	1.92	6.49	12.05	45.55	87.68	14.64	74.73	55.47	52.84	24.64	35.35	37.12
Mauritan	11.75	66.38	28.39	89.62	58.26	2.11	5.01	8.76	33.62	101.58	29.25	44.68	29.80	43.97	26.41	48.27	31.13
Mauritiu	1.85	92.45	16.89	99.01	9.62	1.19	4.32	88.80	7.55	101.20	96.42	97.38	51.18	79.18	57.37	67.56	27.06
Mozamb	16.52	64.21	23.20	77.73	90.38	4.80	5.75	4.33	35.79	83.24	18.92	35.62	105.98	53.37	28.66	29.97	29.40
Niger	20.98	38.82	43.11	64.35	37.97	1.85	4.32	3.05	61.18	80.23	22.63	61.74	39.53	43.97	36.62	14.12	35.61
Nigeria	17.72	63.19	29.50	84.61	41.13	7.04	5.63	31.57	36.81	79.10	15.00	67.26	67.31	43.71	47.64	32.94	
Rwanda	15.92	86.92	20.25	99.09	83.57	4.00	6.54	44.86	13.07	87.46	11.17	35.33	100.35	54.15	51.88	19.75	49.60
Senegal	11.43	64.51	20.16	83.56	45.42	0.72	4.98	30.52	35.49	95.91	28.92	60.14	72.66	58.09	25.81	40.59	39.78
S.Africa	6.73	89.53	9.89	99.58	14.64	1.35	8.26	63.52	15.10	89.74	19.50	73.89	66.52	72.71	70.64	71.09	41.78
Togo	12.67	84.61	20.70	66.90	49.92	1.87	5.66	5.38	15.39	93.84	30.17	53.17	92.22	40.55	13.49	25.56	30.10
Uganda	13.53	92.91	21.16	92.04	76.84	3.00	7.57	30.38	7.09	91.54	23.00	32.01	97.79	53.20	36.81	21.43	32.10
Zambia	14.65	82.95	19.93		77.75	0.44	6.16	40.10	17.04	83.22	18.40	68.33	86.84	56.22	47.99	28.77	

Note: GPI- Gender parity index, FAG-Female in agriculture, AGV-Agricultural value added, HE-Health expenditure per capita, RS-Rural sanitation, OOSC-Out of school children, CPI-Crop production index, PRD-Paved roads, PLG-Persistence to last grade primary, RFM-Ratio of female to male labour force participation rate, IIAG-Ibrahim index African governance, FPST- Female primary school teacher, MPH-Mobile phone subscribers, FSV-Female enrolment secondary vocational education.

Table 2 Females in agricultural employment

	1990-1992	2008-2010	Change	%Change
Botswana	9.09	30.20	21.11	232.32
Mauritius	12.86	7.52	-5.34	-41.52
South .Africa	29.47	4.36	-25.11	-85.21
Benin	36.66	31.06	-5.6	-15.28
Niger	37.21	39.21	2.0	5.37
Congo Republic	39.71	37.61	-2.1	-5.29
Nigeria	44.69	35.05	-9.64	-21.57
Senegal	50.68	38.29	-12.39	-24.45
Togo	52.69	47.89	-4.8	-9.11
Cote d'Ivoire	58.28	54.25	-4.03	-6.91
Ghana	58.60	55.08	-3.52	-6.01
Mauritania	59.45	55.84	-3.61	-6.07
Gabon	62.33	29.43	-32.9	-52.78
Lesotho	67.43	57.45	-9.98	-14.80
Guinea Bissau	68.03	64.46	-3.57	-5.25
Cameroon	69.92	66.79	-3.13	-4.48
Kenya	69.95	66.09	-3.86	-5.52
Central African Republic	70.94	71.00	0.06	0.08
Mali	71.16	62.04	-9.12	-12.82
Zambia	73.81	78.97	5.16	6.99
Madagascar.	76.33	79.69	3.36	4.40
Gambia	78.56	70.70	-7.86	-10.01
Congo Democratic Republic	79.11	80.18	1.07	1.35
Uganda	79.35	71.32	-8.03	-10.12
Malawi	80.32	76.91	-3.41	-4.25
Rwanda	84.92	79.61	-5.31	-6.25
Chad	85.46	82.81	-2.65	-3.10
Burkina Faso	91.82	88.12	-3.7	-4.03
Mozambique.	92.66	88.19	-4.47	-4.82
Burundi	95.98	96.50	0.52	0.54

Data source: Author's calculations.

Table 2 illustrates the trend of female employment in agriculture across Sub Saharan Africa between 1990-1992 and 2008-2010

Table 3 Summary statistics of Principal component analysis of factors affecting child poverty 5-year period

Variable	Obs.	Minimum	Maximum	Mean	Std. deviation
Women final say in social networking	91	17.30	88.60	55.64	17.90
Wife earns less than husband	91	46.00	93.00	74.81	11.37
Women in agriculture	91	14.30	94.40	60.15	19.80
Couple joint decision- use of wife's earnings	91	3.40	67.20	28.57	18.80
Women with secondary or higher education	91	0.40	53.90	16.66	13.44
Women who are literate	91	4.70	96.50	46.68	24.73
Lowest wealth quintile	91	14.60	20.60	19.73	1.03
Primary school enrolment	91	50.10	98.75	72.86	14.30
Ibrahim Index African Governance	91	29.13	74.16	52.18	8.84
Out of school children	91	1.25	50.69	25.60	14.34
Under-five mortality rate	91	3.01	18.54	11.19	3.65
Gender parity index	91	8.00	104.18	87.06	14.43
Child underweight	91	8.70	39.90	23.71	8.49
Birth interval 24-35 months	91	18.10	46.20	37.35	5.69
Birth order 5+	91	0.00	48.40	34.58	9.19
Women giving birth by age 15	91	0.40	13.20	6.81	3.41
Thin women BMI (<18.5)	91	4.30	27.90	13.76	5.16
Skilled antenatal care	91	14.90	99.30	74.29	22.59
Skilled birth attendant	91	3.60	90.60	40.19	19.65
DPT3 vaccination	91	12.40	97.40	59.09	22.35
Breastfeeding & complementary foods	91	2.20	57.80	19.13	12.12
Unprotected well water	91	0.80	56.70	18.23	13.33
No toilet facility	91	1.40	84.40	29.13	23.71
Cooking with wood	91	0.20	94.20	67.22	18.71
Households possessing a mobile telephone	91	6.50	99.60	56.80	24.92
Households with a radio	91	33.40	84.60	61.95	11.12
Children with a birth certificate	91	2.70	92.00	43.39	21.70
School attendance orphans aged 10-14	91	25.70	98.70	70.81	17.93

Table 4 Correlation matrix principal component analysis of factors affecting child poverty 5-year period

Variables	WS	WE	WAG	JD	WHE	WL	LQ	PSE	IIAG	OOSC	U5MR	GPI	CU	BI	BO	AF	BMI	SC	BA	DPT_3	BC	WA	TO	WO	MPH	RA	BR	OPH
WS	**1**	**-0.748**	**0.418**	**0.751**	0.170	0.205	0.156	0.201	0.184	**-0.349**	**-0.418**	**0.333**	-0.179	**-0.360**	**-0.498**	**-0.444**	-0.202	**0.486**	**0.242**	**0.493**	0.074	**-0.588**	-0.176	-0.160	-0.143	0.045	-0.137	**0.442**
WE	**-0.748**	**1**	**-0.383**	**-0.833**	-0.076	**-0.275**	-0.052	**-0.217**	-0.027	**0.268**	**0.422**	**-0.311**	-0.063	**0.408**	**0.510**	**0.300**	0.071	**-0.336**	-0.177	**-0.334**	-0.144	**0.343**	0.037	0.053	**0.322**	0.087	0.198	**-0.327**
WAG	**0.418**	**-0.383**	**1**	**0.525**	-0.080	**-0.222**	0.077	0.044	-0.063	**-0.214**	-0.130	**0.233**	-0.046	-0.010	-0.196	**-0.226**	0.051	0.197	-0.043	**0.266**	-0.009	**-0.211**	-0.203	**0.236**	**-0.375**	-0.042	-0.098	0.011
JD	**0.751**	**-0.833**	**0.525**	**1**	0.172	**0.282**	0.082	**0.228**	0.027	-0.195	**-0.418**	**0.371**	0.060	**-0.317**	**-0.562**	**-0.401**	-0.072	**0.361**	0.124	**0.426**	0.026	**-0.518**	**-0.309**	-0.067	**-0.272**	-0.084	**-0.372**	**0.385**
WHE	0.170	-0.076	-0.080	0.172	**1**	**0.449**	0.096	0.064	0.186	0.072	**-0.232**	0.091	-0.196	-0.056	-0.072	-0.133	0.039	0.089	-0.005	0.158	0.088	**-0.298**	-0.164	**-0.388**	0.202	0.108	-0.005	**0.254**
WL	0.205	**-0.275**	**-0.222**	**0.282**	**0.449**	**1**	-0.041	-0.036	-0.063	0.173	-0.193	0.021	0.105	**-0.267**	**-0.242**	-0.070	0.059	**0.213**	0.175	0.021	0.103	**-0.281**	-0.070	**-0.237**	0.186	0.017	**-0.238**	**0.252**
LQ	0.156	-0.052	0.077	0.082	0.096	-0.041	**1**	**0.225**	**0.267**	-0.185	-0.180	**0.302**	**-0.228**	-0.062	-0.115	-0.148	**-0.208**	**0.237**	0.030	**0.208**	0.132	**-0.329**	**-0.305**	**-0.241**	0.103	**0.228**	**0.258**	0.202
PSE	0.201	**-0.217**	0.044	**0.228**	0.064	-0.036	**0.225**	**1**	**0.241**	**-0.483**	**-0.377**	0.163	**-0.437**	**0.224**	0.072	-0.093	**-0.225**	0.187	-0.037	0.160	0.043	-0.141	-0.096	**-0.254**	-0.031	0.186	-0.187	**0.251**
IIAG	0.184	-0.027	-0.063	0.027	0.186	-0.063	**0.267**	**0.241**	**1**	**-0.497**	**-0.604**	**0.307**	**-0.357**	**-0.222**	-0.195	**-0.474**	**-0.421**	**0.310**	0.081	**0.556**	-0.077	**-0.269**	**-0.347**	**-0.359**	**0.255**	**0.417**	0.059	0.112
OOSC	**-0.349**	**0.268**	**-0.214**	-0.195	0.072	0.173	-0.185	**-0.483**	**-0.497**	**1**	**0.525**	**-0.281**	**0.511**	0.026	0.114	0.093	**0.541**	**-0.375**	-0.183	**-0.377**	**-0.254**	**0.211**	**0.331**	0.153	-0.001	-0.189	0.171	**-0.507**
U5MR	**-0.418**	**0.422**	-0.130	**-0.418**	**-0.232**	-0.193	-0.180	**-0.377**	**-0.604**	**0.525**	**1**	**-0.410**	**0.324**	0.197	**0.273**	**0.346**	0.165	**-0.429**	-0.205	**-0.457**	-0.157	**0.454**	**0.301**	**0.433**	-0.115	**-0.208**	0.095	**-0.317**
GPI	**0.333**	**-0.311**	**0.233**	**0.371**	0.091	0.021	**0.302**	0.163	**0.307**	**-0.281**	**-0.410**	**1**	-0.153	-0.019	-0.186	**-0.308**	-0.119	**0.288**	0.078	**0.457**	-0.128	**-0.375**	**-0.376**	-0.126	0.051	0.010	**-0.224**	**0.356**
CU	-0.179	-0.063	-0.046	0.060	-0.196	0.105	**-0.228**	**-0.437**	**-0.357**	**0.511**	**0.324**	-0.153	**1**	-0.085	-0.132	-0.106	**0.382**	-0.197	-0.161	**-0.216**	**-0.250**	**0.248**	**0.347**	**0.334**	-0.197	**-0.246**	**-0.241**	**-0.354**
BI	**-0.360**	**0.408**	-0.010	**-0.317**	-0.056	**-0.267**	-0.062	**0.224**	**-0.222**	0.026	0.197	-0.019	-0.085	**1**	**0.730**	**0.391**	**0.227**	**-0.273**	**-0.248**	**-0.246**	-0.101	**0.253**	0.054	0.148	-0.046	-0.063	-0.100	-0.183
BO	**-0.498**	**0.510**	-0.196	**-0.562**	-0.072	**-0.242**	-0.115	0.072	-0.195	0.114	**0.273**	-0.186	-0.132	**0.730**	**1**	**0.509**	**0.250**	**-0.386**	**-0.278**	**-0.464**	0.008	**0.461**	**0.246**	0.180	-0.030	-0.026	0.117	**-0.273**
AF	**-0.444**	**0.300**	**-0.226**	**-0.401**	-0.133	-0.070	-0.148	-0.093	**-0.474**	0.093	**0.346**	**-0.308**	-0.106	**0.391**	**0.509**	**1**	0.189	**-0.352**	-0.134	**-0.711**	**0.273**	**0.564**	**0.320**	**0.343**	-0.175	**-0.341**	-0.006	-0.083
BMI	-0.202	0.071	0.051	-0.072	0.039	0.059	**-0.208**	**-0.225**	**-0.421**	**0.541**	0.165	-0.119	**0.382**	**0.227**	**0.250**	0.189	**1**	**-0.299**	**-0.243**	**-0.350**	-0.119	**0.308**	**0.427**	**0.287**	**-0.254**	**-0.316**	0.133	**-0.470**
SC.	**0.486**	**-0.336**	0.197	**0.361**	0.089	**0.213**	**0.237**	0.187	**0.310**	**-0.375**	**-0.429**	**0.288**	-0.197	**-0.273**	**-0.386**	**-0.352**	**-0.299**	**1**	**0.652**	**0.387**	-0.027	**-0.509**	**-0.334**	**-0.259**	0.051	**0.307**	-0.078	**0.372**
BA	**0.242**	-0.177	-0.043	0.124	-0.005	0.175	0.030	-0.037	0.081	-0.183	-0.205	0.078	-0.161	**-0.248**	**-0.278**	-0.134	**-0.243**	**0.652**	**1**	0.176	0.105	**-0.300**	-0.160	-0.189	0.058	0.181	0.090	**0.322**
DPT_3	**0.493**	**-0.334**	**0.266**	**0.426**	0.158	0.021	**0.208**	0.160	**0.556**	**-0.377**	**-0.457**	**0.457**	**-0.216**	**-0.246**	**-0.464**	**-0.711**	**-0.350**	**0.387**	0.176	**1**	-0.032	**-0.661**	**-0.561**	**-0.277**	0.199	**0.300**	-0.074	**0.315**
BC	0.074	-0.144	-0.009	0.026	0.088	0.103	0.132	0.043	-0.077	**-0.254**	-0.157	-0.128	**-0.250**	-0.101	0.008	**0.273**	-0.119	-0.027	0.105	-0.032	**1**	-0.073	-0.035	-0.007	-0.018	-0.038	0.059	**0.392**
WA	**-0.588**	**0.343**	**-0.211**	**-0.518**	**-0.298**	**-0.281**	**-0.329**	-0.141	**-0.269**	**0.211**	**0.454**	**-0.375**	**0.248**	**0.253**	**0.461**	**0.564**	**0.308**	**-0.509**	**-0.300**	**-0.661**	-0.073	**1**	**0.611**	**0.449**	**-0.281**	**-0.248**	0.013	**-0.526**
TO	-0.176	0.037	-0.203	**-0.309**	-0.164	-0.070	**-0.305**	-0.096	**-0.347**	**0.331**	**0.301**	**-0.376**	**0.347**	0.054	**0.246**	**0.320**	**0.427**	**-0.334**	-0.160	**-0.561**	-0.035	**0.611**	**1**	**0.354**	**-0.268**	**-0.284**	0.057	**-0.509**
WO	-0.160	0.053	**0.236**	-0.067	**-0.388**	**-0.237**	**-0.241**	**-0.254**	**-0.359**	0.153	**0.433**	-0.126	**0.334**	0.148	0.180	**0.343**	**0.287**	**-0.259**	-0.189	**-0.277**	-0.007	**0.449**	**0.354**	**1**	**-0.428**	**-0.355**	**-0.229**	**-0.341**
MPH	-0.143	**0.322**	**-0.375**	**-0.272**	0.202	0.186	0.103	-0.031	**0.255**	-0.001	-0.115	0.051	-0.197	-0.046	-0.030	-0.175	**-0.254**	0.051	0.058	0.199	-0.018	**-0.281**	**-0.268**	**-0.428**	**1**	**0.244**	0.096	0.154
RA	0.045	0.087	-0.042	-0.084	0.108	0.017	**0.228**	0.186	**0.417**	-0.189	**-0.208**	0.010	**-0.246**	-0.063	-0.026	**-0.341**	**-0.316**	**0.307**	0.181	**0.300**	-0.038	**-0.248**	**-0.284**	**-0.355**	**0.244**	**1**	**0.351**	0.024
BR	-0.137	0.198	-0.098	**-0.372**	-0.005	**-0.238**	**0.258**	-0.187	0.059	0.171	0.095	**-0.224**	**-0.241**	-0.100	0.117	-0.006	0.133	-0.078	0.090	-0.074	0.059	0.013	0.057	**-0.229**	0.096	**0.351**	**1**	**-0.243**
OPH	**0.442**	**-0.327**	0.011	**0.385**	**0.254**	**0.252**	0.202	**0.251**	0.112	**-0.507**	**-0.317**	**0.356**	**-0.354**	-0.183	**-0.273**	-0.083	**-0.470**	**0.372**	**0.322**	**0.315**	**0.392**	**-0.526**	**-0.509**	**-0.341**	0.154	0.024	**-0.243**	**1**

Note: *Values in bold are different from 0 with a significance level alpha=0.05*. WS-Women final say in social networking, WE-Wife earns less than husband, WAG-Women in agriculture, JD-Couple's joint decision on the use of wife's earnings, WHE-Women with secondary or higher education, WL-Women who are literate, LQ-lowest wealth quintile, PSE-Primary school enrolment, IIAG-Ibrahim index African governance, OOSC-Out of school children, U5MR- Under-five mortality rate, GPI-Gender parity index, CU-Child underweight, BI-Birth interval 24-35months, BO-Birth order 5+, AF- Adolescent fertility (women giving birth by age 15), BMI-Thin women BMI (<18.5), SC-Skilled antenatal care, BA-Birth attendant, DPT-3 vaccination, BC-Breastfeeding and complementary foods, WA-unprotected well water, TO- No toilet facility, WO-Cooking with wood, MPH-Households with mobile phones, RA- Households with a radio, BR-Children with birth registration, OPH-School attendance by orphans aged 10-14.

Table 5 Correlation matrix of factors affecting child poverty the whole period (1990-2010)

Variables	U5MR	GPI	FAG	MPH	RS	PSE	IIAG	FPST	ORP	RFM	CU	CPI	WF	CL	HE	GOS	PLG	AGV	CM	ELF	PRD	FSV
U5MR	1	**-0.533**	**0.481**	**-0.390**	**-0.475**	**-0.539**	**-0.482**	**-0.462**	**-0.094**	-0.015	**0.560**	**-0.454**	**0.111**	0.039	-0.050	**0.196**	**-0.301**	-0.055	**-0.289**	**0.105**	**-0.435**	**-0.144**
GPI	**-0.533**	1	**-0.136**	**0.211**	**0.372**	**0.391**	**0.342**	**0.662**	**0.201**	**0.151**	**-0.441**	**0.296**	-0.005	0.066	**0.186**	**-0.144**	**0.130**	0.062	**0.240**	**-0.301**	**0.087**	**0.371**
FAG	**0.481**	**-0.136**	1	**-0.395**	**-0.254**	**-0.280**	**-0.428**	**-0.269**	-0.060	**0.448**	**0.399**	**-0.156**	**-0.102**	0.058	0.032	-0.024	**-0.411**	-0.001	-0.050	**-0.190**	**-0.454**	0.075
MPH	**-0.390**	**0.211**	**-0.395**	1	**0.221**	**0.257**	**0.386**	**0.175**	**0.128**	**-0.078**	**-0.381**	**0.295**	0.021	-0.057	0.050	-0.056	**0.190**	-0.043	**0.092**	0.065	**0.148**	0.078
RS	**-0.475**	**0.372**	**-0.254**	**0.221**	1	**0.477**	**0.450**	**0.471**	**0.194**	-0.006	**-0.383**	**0.112**	**-0.090**	0.015	**0.149**	**-0.158**	**0.295**	0.074	**0.283**	-0.070	**0.527**	**0.098**
PSE	**-0.539**	**0.391**	**-0.280**	**0.257**	**0.477**	1	**0.352**	**0.374**	**0.155**	**0.122**	**-0.480**	**0.250**	-0.067	-0.022	**0.141**	**-0.257**	**0.169**	0.057	**0.270**	-0.050	**0.331**	0.038
IIAG	**-0.482**	**0.342**	**-0.428**	**0.386**	**0.450**	**0.352**	1	**0.450**	**0.101**	-0.037	**-0.363**	0.038	-0.070	-0.078	**0.154**	**-0.179**	**0.305**	-0.002	**0.282**	**-0.116**	**0.375**	-0.001
FPST	**-0.462**	**0.662**	**-0.269**	**0.175**	**0.471**	**0.374**	**0.450**	1	**0.165**	**0.100**	**-0.274**	**0.180**	-0.045	0.075	0.059	**-0.123**	**0.272**	-0.070	**0.350**	**-0.346**	**0.214**	**0.361**
ORP	**-0.094**	**0.201**	-0.060	**0.128**	**0.194**	**0.155**	**0.101**	**0.165**	1	**0.138**	**-0.157**	**0.166**	**0.491**	**0.637**	**0.161**	**0.553**	-0.012	-0.021	-0.077	**0.272**	-0.037	0.057
RFM	-0.015	**0.151**	**0.448**	**-0.078**	-0.006	**0.122**	-0.037	**0.100**	**0.138**	1	**-0.161**	0.076	**0.200**	**0.094**	-0.060	0.032	**-0.233**	**-0.154**	**0.342**	**-0.145**	**-0.254**	**0.100**
CU	**0.560**	**-0.441**	**0.399**	**-0.381**	**-0.383**	**-0.480**	**-0.363**	**-0.274**	**-0.157**	**-0.161**	1	**-0.226**	-0.023	**0.182**	**-0.140**	**0.155**	**-0.227**	**-0.092**	**-0.298**	**-0.213**	**-0.162**	-0.074
CPI	**-0.454**	**0.296**	**-0.156**	**0.295**	**0.112**	**0.250**	0.038	**0.180**	**0.166**	0.076	**-0.226**	1	0.039	-0.033	-0.036	-0.017	**0.197**	**-0.153**	0.057	**-0.147**	**0.179**	**0.197**
WF	**0.111**	-0.005	**-0.102**	0.021	**-0.090**	-0.067	-0.070	-0.045	**0.491**	**0.200**	-0.023	0.039	1	**0.556**	0.049	**0.514**	-0.048	-0.026	**-0.183**	**0.217**	**-0.081**	**-0.096**
CL	0.039	0.066	0.058	-0.057	0.015	-0.022	-0.078	0.075	**0.637**	**0.094**	**0.182**	-0.033	**0.556**	1	0.026	**0.610**	-0.034	-0.001	**-0.265**	**0.292**	**-0.126**	0.028
HE	-0.050	**0.186**	0.032	0.050	**0.149**	**0.141**	**0.154**	0.059	**0.161**	-0.060	**-0.140**	-0.036	0.049	0.026	1	-0.021	0.053	**0.811**	0.043	**-0.119**	-0.038	**0.100**
GOS	**0.196**	**-0.144**	-0.024	-0.056	**-0.158**	**-0.257**	**-0.179**	**-0.123**	**0.553**	0.032	**0.155**	-0.017	**0.514**	**0.610**	-0.021	1	-0.008	-0.029	**-0.272**	**0.196**	**-0.131**	-0.061
PLG	**-0.301**	**0.130**	**-0.411**	**0.190**	**0.295**	**0.169**	**0.305**	**0.272**	-0.012	**-0.233**	**-0.227**	**0.197**	-0.048	-0.034	0.053	-0.008	1	0.077	**0.168**	**0.104**	**0.381**	**0.111**
AGV	-0.055	0.062	-0.001	-0.043	0.074	0.057	-0.002	-0.070	-0.021	**-0.154**	**-0.092**	**-0.153**	-0.026	-0.001	**0.811**	-0.029	0.077	1	-0.004	-0.060	0.000	-0.001
CM	**-0.289**	**0.240**	-0.050	**0.092**	**0.283**	**0.270**	**0.282**	**0.350**	-0.077	**0.342**	**-0.298**	0.057	**-0.183**	**-0.265**	0.043	**-0.272**	**0.168**	-0.004	1	**-0.163**	**0.110**	0.070
ELF	**0.105**	**-0.301**	**-0.190**	0.065	-0.070	-0.050	**-0.116**	**-0.346**	**0.272**	**-0.145**	**-0.213**	**-0.147**	**0.217**	**0.292**	**-0.119**	**0.196**	**0.104**	-0.060	**-0.163**	1	**-0.089**	**-0.184**
PRD	**-0.435**	**0.087**	**-0.454**	**0.148**	**0.527**	**0.331**	**0.375**	**0.214**	-0.037	**-0.254**	**-0.162**	**0.179**	**-0.081**	**-0.126**	-0.038	**-0.131**	**0.381**	0.000	**0.110**	**-0.089**	1	**-0.135**
FSV	**-0.144**	**0.371**	0.075	0.078	**0.098**	0.038	-0.001	**0.361**	0.057	**0.100**	-0.074	**0.197**	**-0.096**	0.028	**0.100**	-0.061	**0.111**	-0.001	0.070	**-0.184**	**-0.135**	1

Values in bold are different from 0 with a significance level alpha=0.05

Note:U5MR-under-five mortality rate, GPI-Gender parity index, FAG-Female in agriculture, MPH-Mobile phone subscribers, RS- Rural sanitation, PSE-Primary school enrolment, IIAG-Ibrahim index African governance, FPST-Female primary school teacher, ORP- Orphans enrolled in school, RFM- Ratio of female to male labour force participation rate, CU- Child underweight, CPI- Crop production index, WF-Wood fuel, CL-Child labour, HE-Health expenditure per capita, GOS-Girls out of school, PLG-Persistence to the last grade of primary, AGV-Agricultural value added, CM-Child marriage, ELF-Ethnolinguistic fractionalisation, PRD-Paved roads, FSV- Female enrolment secondary vocational education.

TABLE 6 COMPARISON OF 2SLS AND 3SLS ESTIMATES OF FACTORS AFFECTING CHILD POVERTY

EQUATION 1: DEPENDENT VARIABLE-UNDER FIVE MORLITY RATE								
	2SLS				3SLS			
VARIABLE	(1)	T-STAT	(2)	T-STAT	(3)	T-STAT	(4)	T-STAT
Constant	148.66*	1.82	112.63***	6.03	139.65***	2.84	76.05***	5.64
Primary school enrolment	0.07	1.07	-0.02	-0.62	-0.05***	-2.80	-0.09***	-5.44
Child underweight_1	0.68***	9.36	0.72***	9.81	0.78***	17.08	0.76***	17.56
Gender parity index (enroll. Ratio)	0.01	0.05	0.05	1.58	0.08***	3.50	0.09***	4.42
Female employment in agriculture	0.29	0.72	-0.66***	-4.06	-0.01	-0.46	-0.55***	-4.34
Agricultural value added	-0.01***	-4.01	-0.01***	-3.86	-0.01***	-3.74	-0.00***	-3.83
Health expenditure per capita	-0.26***	-3.10	-0.28***	-4.80	-0.12***	-2.78	-0.13***	-3.53
Rural sanitation	-0.17	-1.28	-0.28**	-2.08	-0.20***	-3.04	-0.21***	-3.60
Ethnolinguistic fractionalization	-0.39***	-3.42	-0.26***	-2.81	-0.43***	-6.35	-0.42***	-6.44
Girls out of primary school	0.12***	3.83	0.12***	3.87	0.02	1.37	0.03	1.62
GDP	-3.97	-1.18			-4.17**	-2.28		
Food price index	-0.67	-0.89			-0.81*	-1.91		
Country dummy-West Africa	0.16	1.46	0.05	0.49	-0.03	-1.08	-0.07**	-2.27
Number of observations	630		630		630		630	
EQUATION 2: DEPENDENT VARIABLE-PRIMARY SCHOOL ENROLMENT								
	2SLS				3SLS			
VARIABLE								
Constant	-0.48*	-1.85	28314.10	1.05	-148.43	-0.40	183.65**	2.09
Under five mortality rate	0.96**	1.98	-113.54	-1.03	-2.83***	-6.84	-2.69***	-7.25
Child underweight	-0.19	-0.52	1576.46**	2.06	-5.35	-1.31	-6.48**	
Gender parity index (enroll. ratio)	-0.21	-0.16	-42.28	-1.47	0.31***	2.63	0.37***	3.45
Crop production index_1	-0.68*	-1.74	22.11	0.25	2.16***	6.31	1.95***	6.44
Roads, paved	-0.14	-0.23	66.57**	2.38	0.30***	5.94	0.28***	6.12
Persistence to last grade of primary	0.19**	2.10	11.14	0.26	0.33***	3.90	0.36***	4.76
Ratio female to male labor F.P. rate	0.29	1.53	-54.28	-1.00	-0.99***	-4.37	-1.02***	-5.05
Children in employment	-0.96	-1.52	-0.05**	-2.17	-0.01***	-4.09	-0.00***	-4.31
Girls out of primary school	-0.29***	-3.90	20.75	1.12	-0.21***	-2.63	-0.22***	-2.96
Ibrahim´s Index of A. Governance	0.29***	2.78	-70.85	-0.56	1.00	0.85	-1.18**	-2.19
Orphans	0.21***	2.64	-0.07**	-2.43	-0.01	-2.00	-0.00*	-1.84
Female primary school teacher	-0.32**	-2.16	21.31	0.51	0.19*	1.69	0.18*	1.74
Mobile phone subscribers	-0.29***	-2.76	72.58	0.63	-1.34	-1.08	1.01*	1.93

GDP	0.16**	2.04			7.56	0.64		
Food price index	0.43**	2.12			2.53	0.87		
Country dummy-Southern Africa	0.29	1.56	-33.97	-0.67	-0.36***	-3.87	-0.33***	-4.03
Country dummy-West Africa	-0.98	-0.59	133.29**	2.16	-0.30**	-2.25	-0.36***	-2.91
Number of observations	630		630		630		630	

EQUATION 3: DEPENDENT VARIABLE- CHILD UNDERWEIGHT

	2SLS				**3SLS**			
VARIABLE								
Constant	26.24***	3.00	22.03***	3.34	21.6***	3.87	24.87***	6.67
Child underweight_1	0.12	0.46	0.83**	2.43	0.48***	6.60	0.484***	7.01
Under five mortality rate	0.01	0.16	0.04	1.32	0.03**	2.17	0.03***	2.79
Primary school enrolment	-0.35***	-4.08	-0.06	-0.47	-0.09***	-3.08	-0.08***	-3.02
Gender parity index (enroll. ratio)	0.01	1.03	-0.01	-0.11	0.01***	3.33	0.01***	3.68
Crop production index			0.63***	2.84	0.29***	3.79	0.33***	5.41
Crop production index_1	-0.09	-0.38	-0.81**	-2.34	-0.43	-6.09	-0.44***	-6.54
Enrolment in sec. vocational, female	0.34	0.66	0.66	1.32	-0.69***	-3.62	0.71***	-3.80
Wood fuel	0.19	0.49	-0.29	-0.68	0.58***	3.34	0.61***	3.65
Age at first marriage	0.01*	1.76	0.01	0.52	0.01***	2.96	0.04***	2.83
Out of school children	0.35***	4.02	0.06	0.51	0.09***	2.97	0.08***	2.91
Married women –bank account					-0.01**	-2.25	-0.02**	-2.27
Ibrahim´s Index of A. Governance	-0.01*	-1.74	0.01	0.81	-0.01	-0.39	0.02**	-2.06
Ethnolinguistic fractionalization			0.01	1.28	-0.01**	-1.98	-0.01**	-2.13
Mobile phone subscribers					0.01	0.20	0.02*	1.90
GDP	0.72	0.88			0.27	0.96		
Food price index	0.16	0.87			0.06	0.98		
Regional dummies, West Africa	-0.01	-0.64	0.01	0.56	-0.04**	-2.26	-0.00**	-2.37
Regional dummies, Southern Africa	-0.01	-1.14	0.01	0.39	-0.01*	-1.71	0.01	-1.56
Number of observations	630		630		630		630	

The numbers in parentheses below the estimated coefficients are absolute values of the "t" ratios. Three asterisks, two asterisks and one asterisk besides the estimated coefficients denote statistical significance at 0.01, 0.05 and 0.10 levels respectively valued at two-sided test. All the variables are in percentages, with the exception of regional dummies and married women with access to bank account which is a dummy variable

Issues regarding misspecification in terms of choosing which variables to include and which estimates to apply have led to the comparison of 2SLS and 3SLS estimates as shown in Table 6. Columns 1 and 3 represent 2SLS and 3SLS estimates with the inclusion of GDP and food price index, while columns 2 and 4 represent 2SLS and 3SLS estimates with the exclusion of GDP and food price index across all the 3 equations.

In equation 1 all the columns have the expected signs with the exception of female employment in agriculture in 2SLS estimates with the inclusion of GDP and food price index (column 1). The second equation has 4 variables with unexpected signs in 2SLS estimates with the inclusion of GDP and food price index (column 1) and 2 variables in 2SLS with the exclusion of GDP and food price (column 2), whereas all the variables in 3SLS with inclusion of GDP and food price index (column 3) and 3SLS with the exclusion of GDP and food price index (column 4) have the expected signs. In the third equation, all the variables have the expected signs in both 2SLS and 3SLS estimates in all the columns.

The total number of statistically insignificant coefficients in equation 1 are 7 in 2SLS with GDP and food price index (column 1), 3 in 2SLS with the exclusion of GDP and food price index (column 2), 3 in 3SLS with the inclusion of GDP and food price index (column3) and 1 in 3SLS with the exclusion of GDP and food price index (column 4). The second equation has 7 variables with statistically insignificant coefficients in 2SLS with the inclusion of GDP and food price index (column1), 10 in 2SLS without GDP and food (column 2), 6 in 3SLS with GDP and food price index (column 3), while all the estimated coefficients in 3SLS without GDP and food price index (column 4) are statistically significant. The third equation has 10 statistically insignificant coefficients in 2SLS with GDP and food price index (column 1), 11 in 2SLS without GDP and food price index (column 2), 5 in 3SLS with inclusion of GDP and food price index (column 3) and 1 in 3SLS without GDP and food price index (column 4). These findings suggest that the inclusion of GDP and food price index in columns 1 and 3 has contributed to both high numbers of variables with unexpected signs as well as statistically insignificant coefficients.

The results imply that 2SLS estimates with the exclusion of GDP and food price index (column 2) in comparison to 3SLS estimates with the exclusion of GDP and food price index (column 4) shows that all the equations have variables with the expected signs with the exception of equation 2 2SLS estimates without GDP and food price index (column 2). However, in terms of statistical significance 2SLS without GDP and food price index (column 2) has 3, 10 and 11 insignificant estimated coefficients in equations 1, 2 and 3 respectively. Whereas 3SLS without GDP and food price index (column 4) has 1, 0 and 1 statistically insignificant estimated coefficients in equations 1, 2 and 3 respectively. Based on this sensitivity analysis, we have chosen 3SLS over 2SLS estimates.

APPENDIX 2. Table 1 Comparison of averages of economic growth with averages of child poverty indicators (1990-2010)

INDEX	GDP per capita	U5MR	Child underweight	Primary school enrol.	Pub. exp. education	DPT_3	Birth attendant.	Pre-primary enrol	ratio girls-boys enrol
Mauritius	3.69	1.85	15	93	4	93	98	90	100
Botswana	3.04	5.81	13	84	8	96	94	17	100
South .Africa	0.75	6.73	9	90	6	73	92	38	97
Gabon	-0.29	8.17	9	92	3	54	86	14	100
Ghana	2.39	9.91	21	65	6	78	50	58	94
Kenya	0.27	10.05	18	69	6	83	48	44	99
Madagascar	-0.71	10.27	36	66	3	67	51	6	97
Lesotho	2.45	10.42	16	71	12	85	55	24	106
Congo Democratic.	-3.49	10.88	31	63	3	58	74	5	93
Senegal	0.62	11.43	19	62	4	71	52	6	89
Mauritania	0.97	11.74	29	64	3	52	61	2	96
Togo	-0.27	12.67	20	84	4	67	62	4	78
Gambia	0.58	13.17	19	59	3	90	57	21	90
Uganda	3.61	13.53	19	93	5	61	42	13	93
Cote d'Ivoire	-0.74	13.67	21	55	5	63	57	2	79

Cameroon	-0.46	13.84	18	86	3	59	63	15	86
Benin	1.27	14.11	24	68	4	74	78	6	66
Zambia	0.48	14.64	20	81	2	84	47	2	94
Malawi	1.75	15.64	22	97	5	88	54		98
Rwanda	3.02	15.92	22	84	5	86	52	7	101
Burundi	-1.18	16.46	34	57	4	81	34	2	85
Mozambique.	3.60	16.52	23	62	4	67	48		80
Central Africa Republic	-1.04	17.02	23	61	2	50	53	4	68
Congo R.	0.31	17.56	18	52	3	39	83	1	81
Nigeria	2.27	17.72	30	64	4	38	35	13	85
Burkina F.	2.42	18.07	32	37	4	63	54	2	74
Guinea B.	0.01	18.36	21	52	5	63	39	5	65
Chad	2.40	18.09	33	51	2	25	14	1	59
Niger	-0.50	20.98	42	36	3	40	33	2	70
Mali	1.66	21.18	31	53	4	58	49	2	75

Economic growth does not necessarily reduce child poverty; its effect largely depends on the kind of growth and how it is distributed. For instance, several countries have less than 1% GDP per capita growth but have less than 11% U5MR. Examples are South Africa, Gabon, Kenya, Madagascar, Congo Democratic Republic and Senegal. Other countries have over 1% GDP per capita growth but have above 13% U5MR – Uganda, Benin, Malawi, Rwanda, Mozambique, Nigeria, Burkina Faso, Chad and Mali (please see Table 4 in Appendix 3). These findings on economic growth are in line with the literature review in Chapter 2.

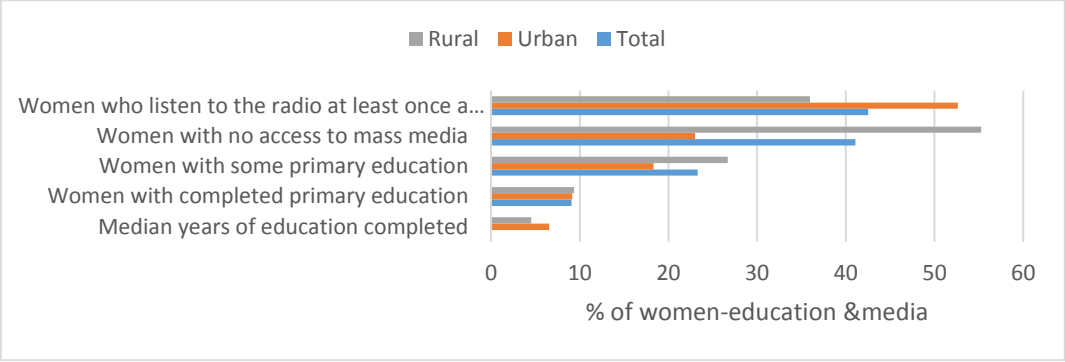

Figure 1 Women's status examined by median years of education and information status by residence in Sub Saharan Africa

Table 2 Comparison of Sub Saharan Africa Performance 1990 and 2010

	1990	2010	Change	% Change
Under Five Mortality Rate	15.89	10.31	-5.58	-35.00
Female Employment In Agriculture	64.01	57.97	-6.04	-9.00
Rural Sanitation	21.43	27.93	6.50	30.00
Ratio Of Female To Male Labor Force Participation	74.49	82.38	7.89	11.00
Underweight Children	26.73	18.05	-8.68	-32.00
Health Expenditure	6.50	6.19	-0.31	-5.00
Female Primary Teacher	33.01	41.29	8.25	25.00
Female Sec. Vocational	35.86	42.06	6.20	17.00
Enrolment Ratio Gender Parity Index	77.73	89.05	11.32	15.00
Out Of School Children	39.63	20.92	-18.71	-47.00
Enrolment Primary School	60.07	79.08	19.01	32.00
Ibrahim's Index African Governance	47.64	52.22	4.58	10.00
Persistence To Last Grade Primary	51.22	60.66	9.44	18.00
Agricultural Value Added	0.89	5.37	4.48	503.00

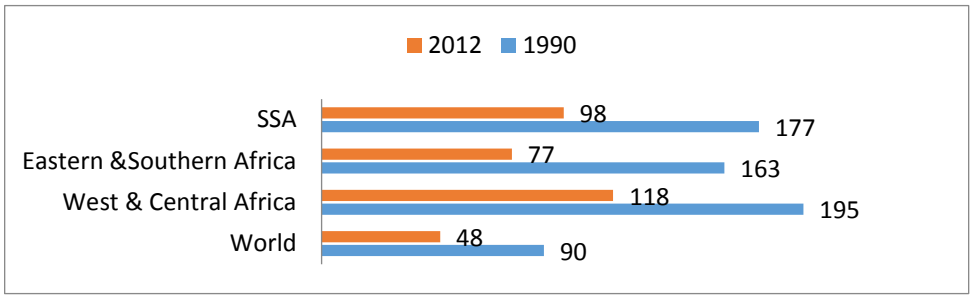

Figure 2 Decline in U5MR between 1990 and 2012 Source: UNICEF (2013)

Figure 2 shows the declining trend of U5MR in the world as a whole, SSA as a region and the regions within SSA. Comparisons of U5MR between 1990 and 2012 indicate that Eastern and Southern Africa have performed much better in reducing U5MR as compared to West and Central Africa.

Table 3 School attendance rate of orphans aged 10-14 by residence, sex, ratio with non-orphans & wealth quartile

	School attendance rate of orphans aged 10-14					Ratio of orphans to non-orphans in school attendance					
Country	Survey	Rural	Urban	Male	Female	Male	Female	Urban	Rural	Lowest	Highest
Benin	2012	62.20	65.10	74.00	53.10	0.94	0.73	0.77	0.88	0.78	0.59
Burkina	2010	43.00	64.10	61.20	48.00	1.12	0.93	0.75	0.92	0.72	0.75
Burundi	2010	74.50	76.00	72.20	76.90	0.78	0.85	0.79	0.82	0.84	0.79
Cameroo	2011	72.10	91.10	76.10	84.90	0.85	1.04	0.97	0.91	0.80	1.00
Chad	2004		71.90	66.30	46.80	1.23	1.23	1.02	0.19	0.00	1.00
CongoR	2012	88.40			94.20	1.00	0.99	1.02	0.94	0.93	1.01
CongoD	2014	66.10	87.60	78.30	69.90	0.83	0.77	0.91	0.73	0.73	0.89
dÍvoire	2012	50.40	44.40	66.60	33.90	0.88	0.52	0.58	0.76	0.89	0.46
Gabon	2012		100.00	99.00	98.50	1.01	1.01	1.02	0.93	0.95	1.02
Gambia	2013	62.30	71.20	66.70	66.90	0.88	0.92	0.84	0.96	1.30	0.86
Ghana	2014	82.60	71.00	78.20	74.50	0.97	0.92	0.85	1.04	1.01	0.75
Kenya	2014	96.20	96.20	95.00	97.40	0.98	1.01	0.98	1.00	1.06	0.90
Lesotho	2009	91.40	100.00	86.20	98.50	0.94	1.01	1.01	0.98	0.99	1.01
Madaga	2008	58.20		59.90	59.60	0.74	0.75	0.73	0.74	0.40	0.66
Malawi	2010	90.10	92.40	89.40	92.00	0.96	0.98	0.95	0.97	1.00	0.94
Mali	2006	30.90	59.90	53.50	32.30	1.02	0.74	0.82	0.77	0.55	0.71
Mozam	2011	72.80	76.10	76.20	71.40	0.93	0.89	0.82	0.95	1.07	0.90
Niger	2012	45.10	68.70	49.30	52.60	0.98	1.21	0.87	1.10	1.30	0.83
Nigeria	2013	75.70	99.40	87.80	87.40	1.18	1.28	1.09	1.27	1.49	1.02
Rwanda	2010	88.80		91.20	83.80	0.95	0.87	0.80	0.93	1.04	0.87
Senegal	2011	60.50	63.50	56.90	66.90	0.90	1.03	0.76	1.19	1.33	0.75
Togo	2014	87.60		93.20	83.70	1.01	0.96	0.92	1.00	0.98	1.03
Uganda	2011	82.90	91.90	82.70	85.80	0.87	0.90	0.95	0.87	0.77	0.92
Zambia	2014	72.60	86.20	78.70	78.30	0.87	0.86	0.91	0.81	0.84	1.00

Figure 3 The trends and levels of stunting amongst children across Sub Saharan African
Source: Teller and Alva 2008

A combination of basic causes such as lack of targeted public spending and rural women's limited access to productive resources reinforce each other consequently exacerbating levels of child poverty. The exacerbated child poverty levels manifest themselves through deprivation indicators such as lack of provision and access to quality healthcare and education; and lack of access to food, particularly micronutrient rich food. Due to the multidimensional nature of child poverty, a woman's lack of good quality food will most likely cause her to give birth to an underweight baby. Being illiterate, poor and malnourished implies that the woman will not be able to breastfeed her child neither will she be able to afford to buy nutritious food nor will she have the knowledge to be a good caregiver. This scenario mostly culminates with stunted children across countries of Sub Saharan Africa as evident in Figure 3. The long-term consequences, if the child escapes death, are to live a life with cognitive impairment which usually turns out to be an obstacle to the fulfilment of full potential.